

MOISTURE & DENSITY TEST

Client : URS/ARUP/HMM JV

Project : California High Speed Train

ISI Lab No.: G-52675
Job no : 2636-001.0

Boring #	S0072R	S0072R	S0072R	S0072R	S0072R			
Sample #	U5	MC08-2	SS15	MC17-1	SS19			
Depth (ft.)	13.0-15.0	30.5-31.0	66.0-66.5	76.0-76.5	86.0-86.5			
Soil type: (visual)	Olive gray sandy clay	Dark grayish brown clay with sand	Dark grayish brown clay	Dark brown sandy silt	Dark grayish brown clay			
1. Date tested:	11/18/13	11/10/13	11/08/13	11/10/13	11/08/13			1.
2. Tested by:	JH	JH	JH	JH	JH			2.
3. Specimen height (in.)	4.08	6.00		6.00				3.
4. Wt. of specimen + tare (gm)	831.58	910.45		975.42				4.
5. Tare wt. (gm)	0.00	0.00		0.00				5.
6. Diameter (in.)	2.86	2.42		2.42				6.
7. Wet wt. of soil + dish wt. (gm)	242.59	408.66	84.14	241.02	91.91			7.
8. Dry wt. of soil + dish wt. (gm)	205.48	342.02	75.64	211.16	82.33			8.
9. Wt. of dish (gm)	50.97	84.19	30.28	50.61	30.39			9.
10. Dish ID								10.

Wet Density (pcf)	120.8	125.6		134.5				
Dry Density (pcf)	97.4	99.8		113.4				
Moisture Content (%)	24.0	25.8	18.7	18.6	18.4			

Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.730	0.688		0.485				
Saturation (%)	88.8	101.4		103.5				

Additional data:

Wt. of dry soil + dish before washing (gm)								
Wt. of dry soil + dish after washing (gm)								
% Passing # 200 sieve								
USCS symbol								

MOISTURE & DENSITY TEST

Client : URS/ARUP/HMM JV

Project : California High Speed Train

ISI Lab No.: G-52923

Job no : 2636-001.0

Boring #	S0071R	S0072R	S0072R	S0073R				
Sample #	MC03-2	MC10-2	MC22-1	MC15-2				
Depth (ft.)	10.5-11.0	40.5-41.0	101.0-101.5	65.5-66.0				
Soil type: (visual)	Olive brown clay with sand	Olive brown sandy clay	Olive gray clay	Grayish brown fat clay				
1. Date tested:	01/16/14	01/16/14	01/16/14	01/15/14				1.
2. Tested by:	JH	JH	JH	JH				2.
3. Specimen height (in.)	5.70	5.69	5.70	5.07				3.
4. Wt. of specimen + tare (gm)	827.13	911.75	809.21	761.54				4.
5. Tare wt. (gm)	0.00	0.00	0.00	0.00				5.
6. Diameter (in.)	2.41	2.41	2.42	2.41				6.
7. Wet wt. of soil + dish wt. (gm)	278.22	330.48	269.70	197.27				7.
8. Dry wt. of soil + dish wt. (gm)	228.86	287.82	216.15	167.76				8.
9. Wt. of dish (gm)	50.79	51.23	50.95	51.10				9.
10. Dish ID								10.
Wet Density (pcf)	121.1	133.7	117.5	125.3				
Dry Density (pcf)	94.8	113.3	88.7	100.0				
Moisture Content (%)	27.7	18.0	32.4	25.3				
Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.777	0.487	0.899	0.684				
Saturation (%)	96.3	99.9	97.4	99.8				
Additional data:								
Wt. of dry soil + dish before washing (gm)								
Wt. of dry soil + dish after washing (gm)								
% Passing # 200 sieve								
USCS symbol								

COMPACTION TEST REPORT

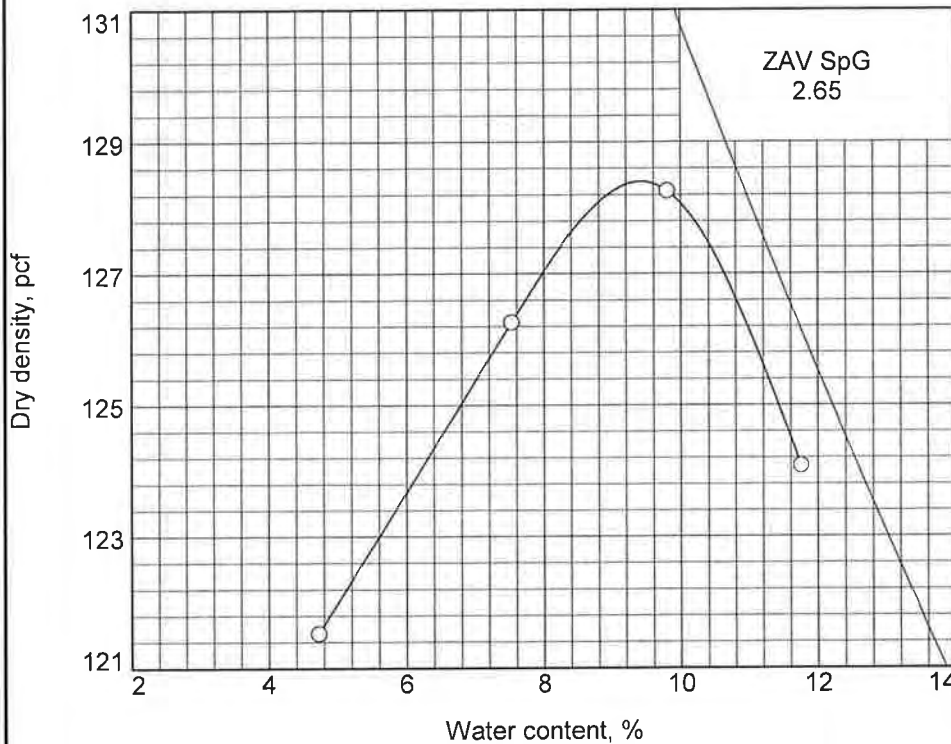
Curve No.
52675

Test Specification:
ASTM D 1557-07 Method B Modified

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: 0.03333 cu. ft.

Test Performed on Material
Passing 3/8 in. **Sieve**

Soil Data
NM _____ **Sp.G.** _____
LL _____ **PI** _____
%>3/8 in. 0 **%<#200** 39
USCS _____ **AASHTO** _____



TESTING DATA

	1	2	3	4	5	6
WM + WS	4160.0	4083.0	4127.0	3954.0		
WM	2020.0	2020.0	2020.0	2020.0		
WW + T #1	603.9	565.7	582.1	633.6		
WD + T #1	550.0	526.1	520.9	605.0		
TARE #1	0.0	0.0	0.0	0.0		
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	9.8	7.5	11.7	4.7		
DRY DENSITY	128.3	126.3	124.1	121.5		

TEST RESULTS

Maximum dry density = 128.4 pcf

Optimum moisture = 9.4 %

Project No. 2636-001.0 **Client:** URS/ARUP/HMM JV

Project: California High Speed Train

○ **Source:** S0072R G-52675

Depth: 0.0-5.0

Sample No.: B01



Material Description

Brown clayey sand

Remarks:

Figure

Tested By: JH

Checked By: LL/PH

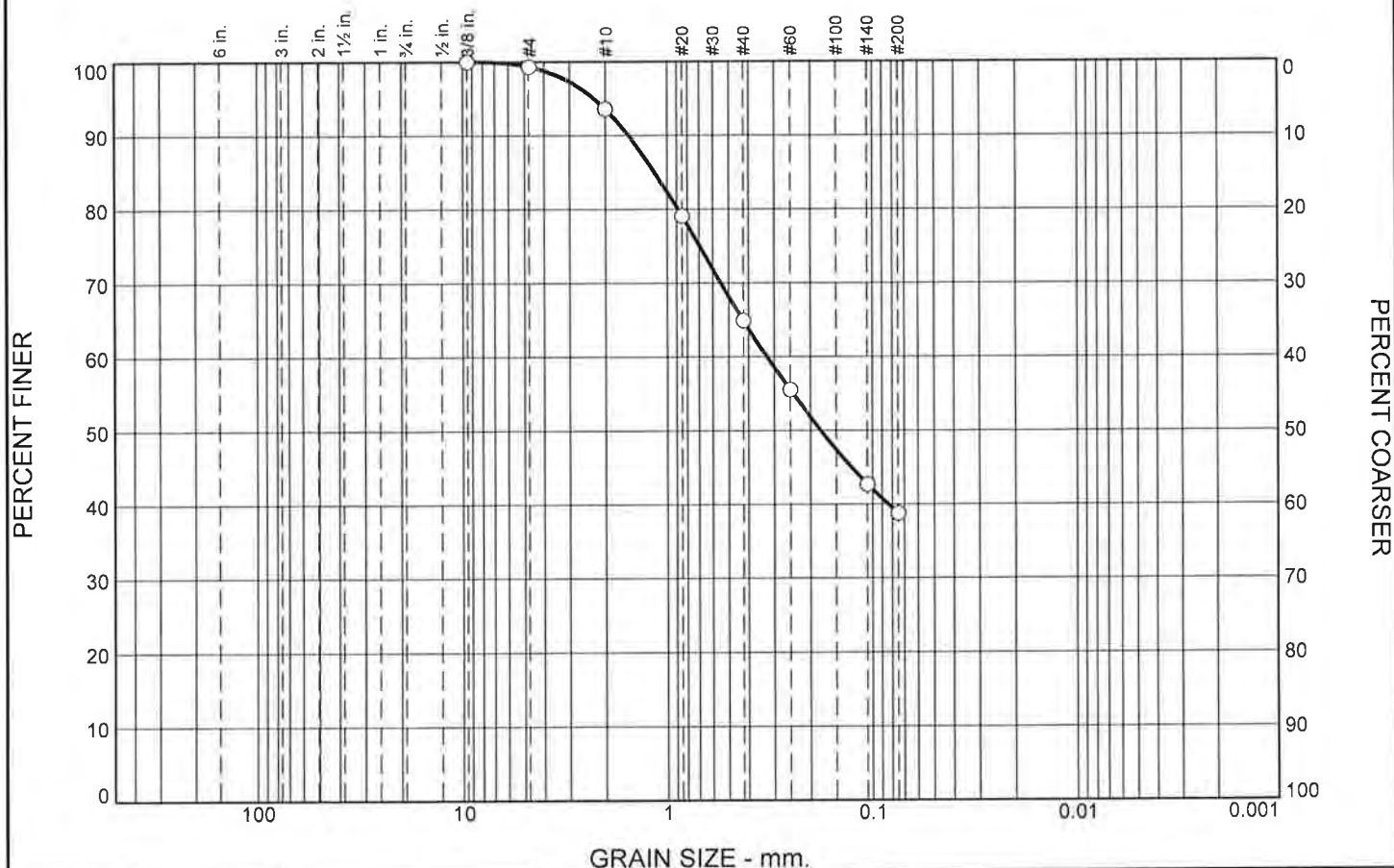


Lab. Tech : K. Ford
Date Completed : 1/20/14

Notes:

Enginnering Materials Laboratory
4539 N. Brawley #108, Fresno, CA 93722
559-276-9311

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	1	5	29	26	39	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100		
#4	99		
#10	94		
#20	79		
#40	65		
#60	55		
#140	43		
#200	39		

* (no specification provided)

Soil Description
Brown clayey sand

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 1.5410 D₈₅= 1.1507 D₆₀= 0.3260
 D₅₀= 0.1784 D₃₀= D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= AASHTO=

Remarks
 F.M.=1.42

Source of Sample: S0072R G-52675
Sample Number: B01

Depth: 0.0-5.0

Date: 10/17/13

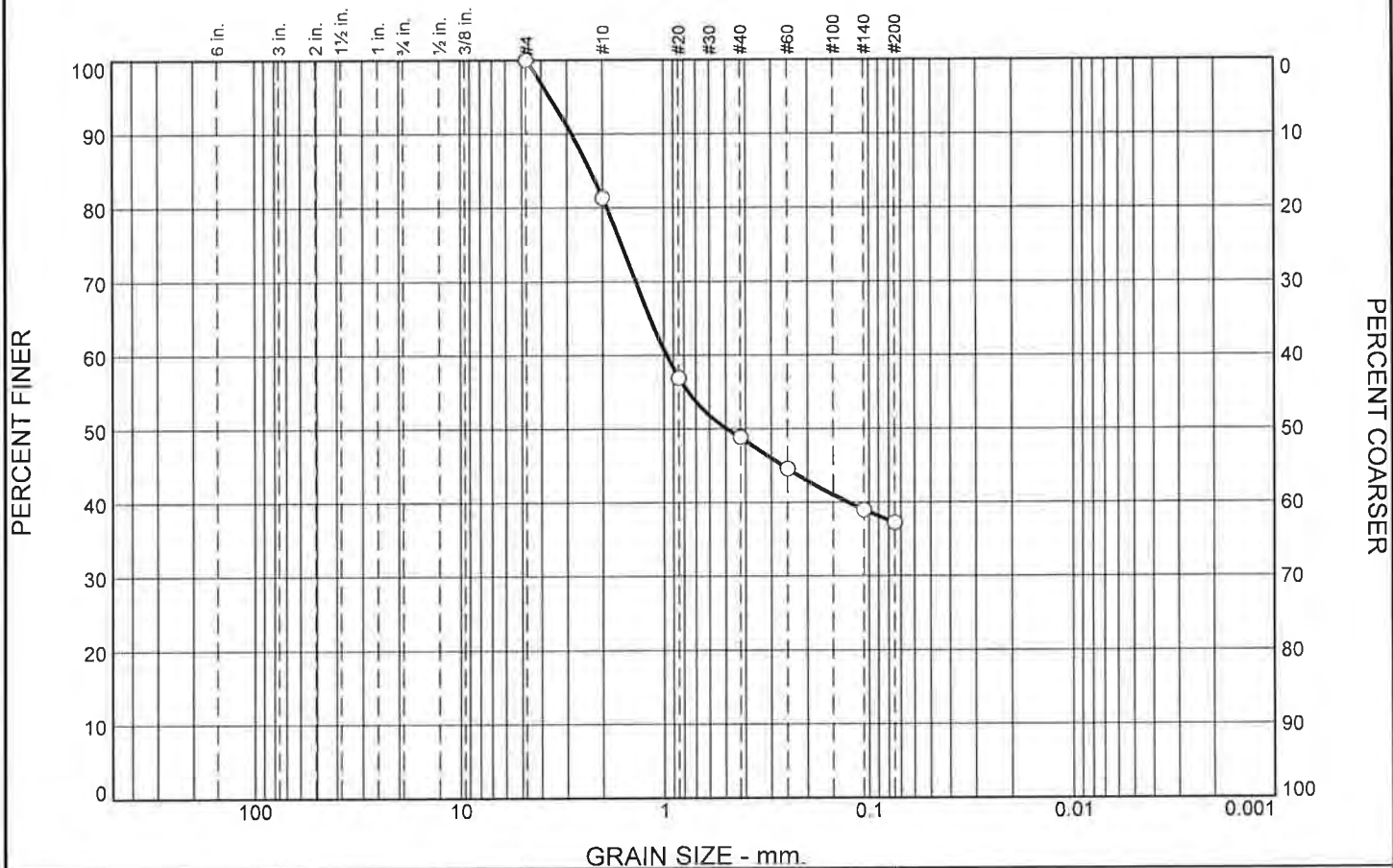


Client: URS/ARUP/HMM JV
Project: California High Speed Train

Project No: 2636-001.0

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	19	32	12	37	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	81		
#20	57		
#40	49		
#60	45		
#140	39		
#200	37		

* (no specification provided)

Soil Description
Olive gray clayey sand

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 2.8442 D₈₅= 2.2952 D₆₀= 0.9716
 D₅₀= 0.4930 D₃₀= D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= AASHTO=

Remarks
 F.M.=2.10

Source of Sample: S0072R G-52675
Sample Number: B03

Depth: 7.0-10.0

Date: 11/04/13

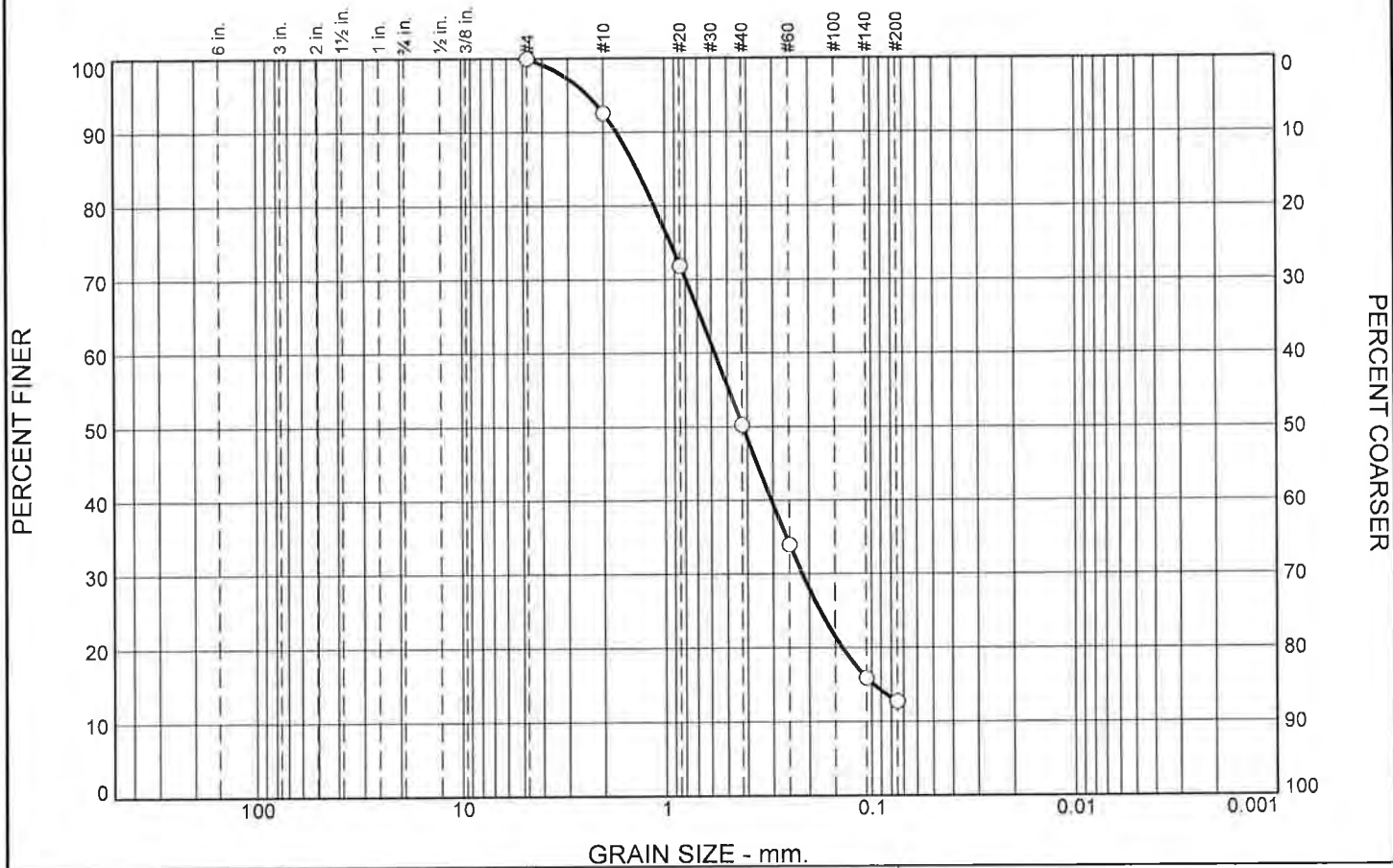


Client: URS/ARUP/HMM JV
Project: California High Speed Train

Project No: 2636-001.0

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	7	43	37	13	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	93		
#20	72		
#40	50		
#60	34		
#140	16		
#200	13		

* (no specification provided)

Soil Description

Gray sand

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 1.7304 D₈₅= 1.3761 D₆₀= 0.5770
D₅₀= 0.4212 D₃₀= 0.2168 D₁₅= 0.0979
D₁₀= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

F.M.=2.02

Source of Sample: S0072R G-52675
Sample Number: SS07

Depth: 26.0-26.5

Date: 11/4/13

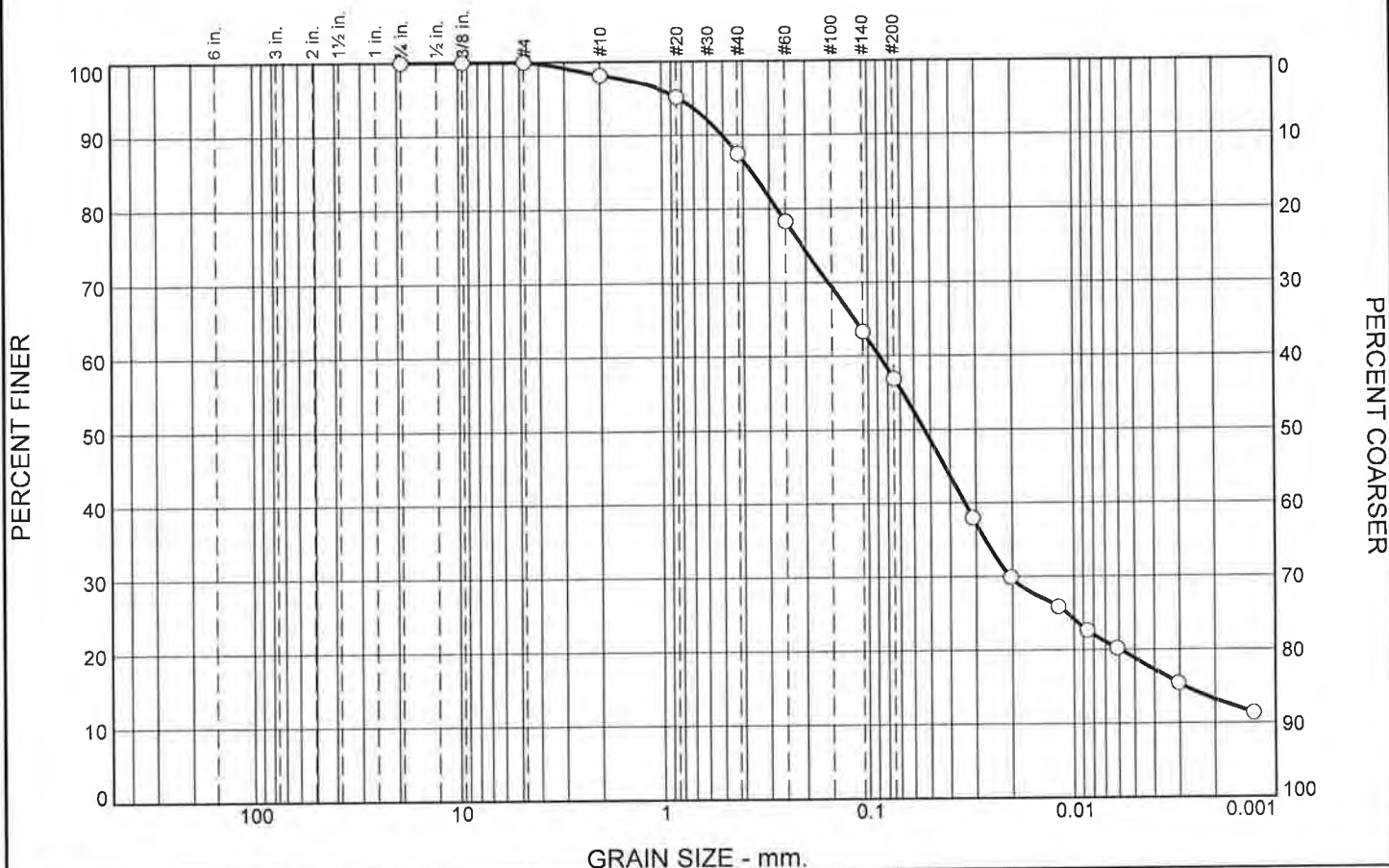


Client: URS/ARUP/HMM JV
Project: California High Speed Train

Project No: 2636-001.0

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	2	10	31	38	19

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100		
3/8	100		
#4	100		
#10	98		
#20	95		
#40	88		
#60	78		
#140	63		
#200	57		
0.0312 mm.	38		
0.0204 mm.	30		
0.0120 mm.	26		
0.0086 mm.	23		
0.0061 mm.	20		
0.0031 mm.	15		
0.0013 mm.	11		

* (no specification provided)

Soil Description
Olive brown silty sand with clay

Atterberg Limits
PL= LL= PI=

Coefficients
D₉₀= 0.5056 D₈₅= 0.3647 D₆₀= 0.0883
D₅₀= 0.0535 D₃₀= 0.0206 D₁₅= 0.0028
D₁₀= C_u= C_c=

Classification
USCS= AASHTO=

Remarks
F.M.=0.62

Source of Sample: S0072R G-52675
Sample Number: SS11

Depth: 46.0-46.5

Date: 10/29/13



Client: URS/ARUP/HMM JV
Project: California High Speed Train

Project No: 2636-001.0

Figure



*Construction Testing & Inspection * Geotechnical & Environmental Engineering*

Sieve Analysis for Soil and Fine Aggregate

Project:	CA HSR FRE_BAK	Technician:	K. Ford
TES#:	23502-ZS9	Date:	1/14/2014
Boring No.:	S0072R	Depth, ft	51-51.5'
Sample No.:	MC12-1	Classification:	(SM/ML) Sandy Silt

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	74.0	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	74.0	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	38.1	2"	44.0 (20.0)

Sieve Size	Individual Weight Retained	Individual % Retained	Combined % Retained	Combined % Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#10	0.2	0.3	0.3	99.7	
#16	0.2	0.3	0.5	97.2	
#30	6.3	8.5	9.1	91.0	
#40	2.9	3.9	13.0	87.1	
#50	4.0	5.4	18.4	81.7	
#100	9.5	12.8	31.2	68.9	
#200	13.4	18.1	49.3	50.8	
Pan					

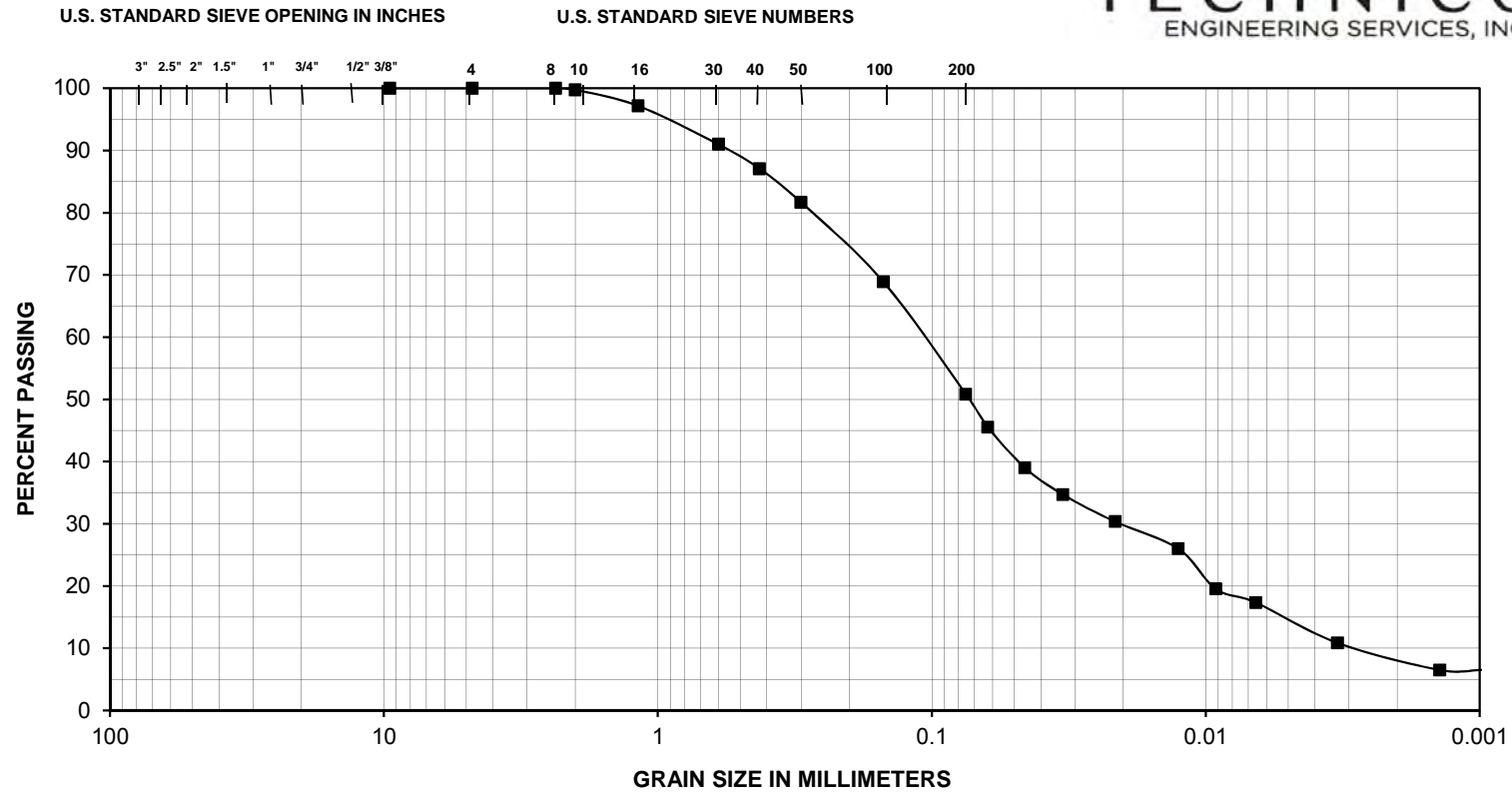


Construction Testing & Inspection * Geotechnical & Environmental Engineering

HYDROMETER TEST DATA SUMMARY

ASTM D 422-63

PROJECT: CA HSR FRE_BAK		TES #: S0072R					
Boring Number S0072R		DATE: 1/14/2014					
Sample Depth, ft	51-51.5'	Sample No.:	MC12-1				
		TESTED BY:	K. Ford				
Mass of Test Sample, g	75.00	"air-dried"	Hydrometer Type 151H				
Mass of Hygroscopic Sample, g	30.00	"air-dried"					
Mass of Hygroscopic Sample, g	29.60	"oven-dried"	Specific Gravity of Test Material	2.650			
Mass of Test Sample, g	74.00	"oven-dried"	Specific Gravity of Test Solution	Varies			
Time (min.)	Hydrometer Reading	Corrected Reading	Temperature Degrees C	Effective Depth Table 2 (cm)	Constant, K Table 3	Diameter, D (mm)	Amt. Suspended, P (%)
0.5	1.023	1.021	21	10.7	0.01348	0.0624	45.6
1	1.020	1.018	21	11.5	0.01348	0.0457	39.1
2	1.018	1.016	21	12.1	0.01348	0.0332	34.8
5	1.016	1.014	21	12.6	0.01348	0.0214	30.4
15	1.014	1.012	21	13.1	0.01348	0.0126	26.1
30	1.011	1.009	21	13.9	0.01348	0.0092	19.6
60	1.010	1.008	21	14.2	0.01348	0.0066	17.4
250	1.007	1.005	21	15.0	0.01348	0.0033	10.9
1440	1.005	1.003	21	15.5	0.01348	0.0014	6.5
2880	1.005	1.003	21	15.5	0.01348	0.0010	6.5



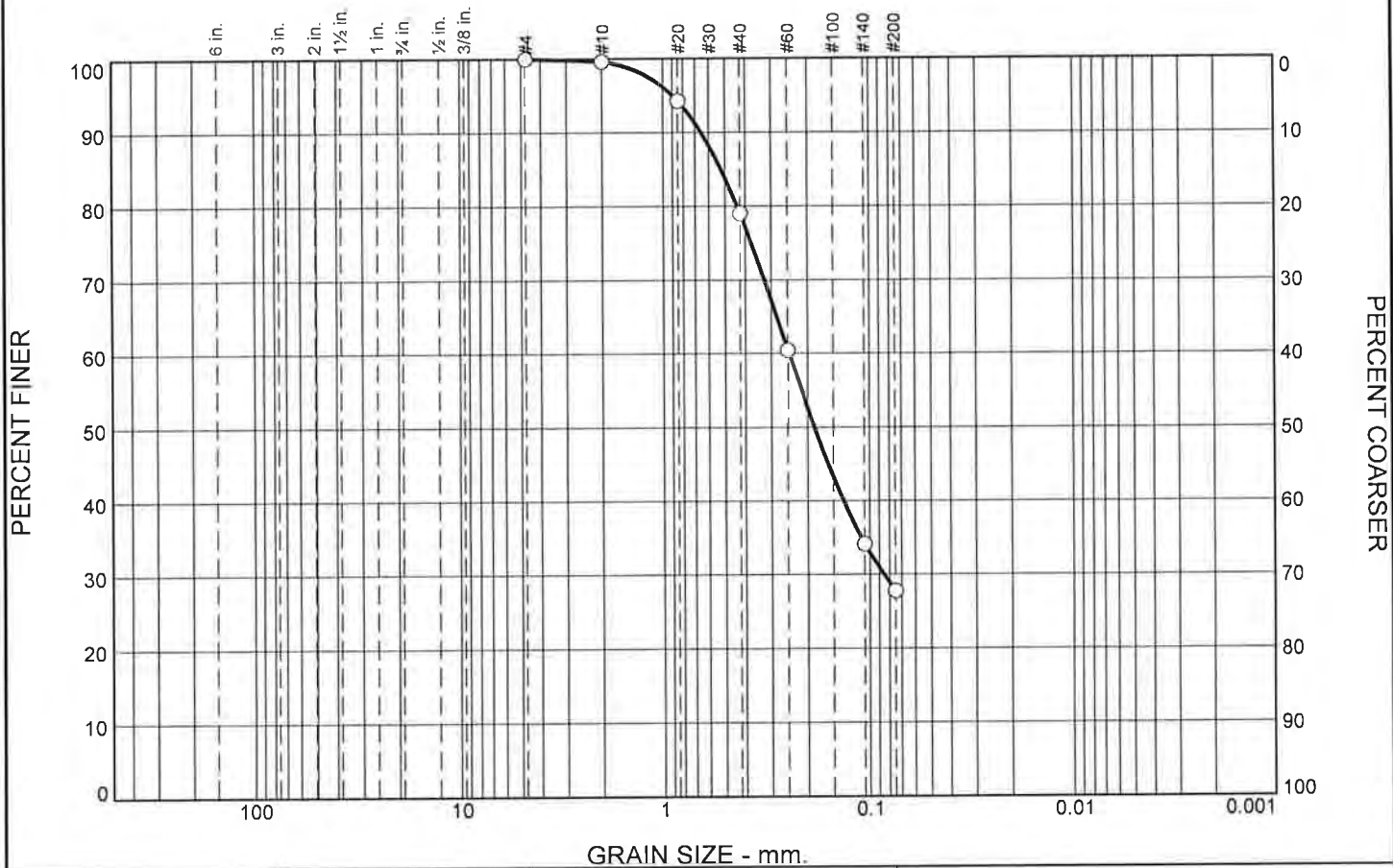
GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

—■— 51-51.5'

Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	CA HSR FRE_BAK
MC12-1	(SM/ML) Sandy Silt	0	49.3	36.0	14.6	1.4					
										TES#:	23502-ZS9
										Boring#:	S0072R
										Date:	1/14/2014

* Particles smaller than 5 Micron in diameter

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	21	51	28	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	94		
#40	79		
#60	60		
#140	34		
#200	28		

* (no specification provided)

Soil Description
Brown clayey sand

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 0.6556 D₈₅= 0.5245 D₆₀= 0.2469
 D₅₀= 0.1857 D₃₀= 0.0853 D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= AASHTO=

Remarks
 F.M.=1.04

Source of Sample: S0072R G-52675
Sample Number: SS14

Depth: 61.0-61.5

Date: 11/04/13

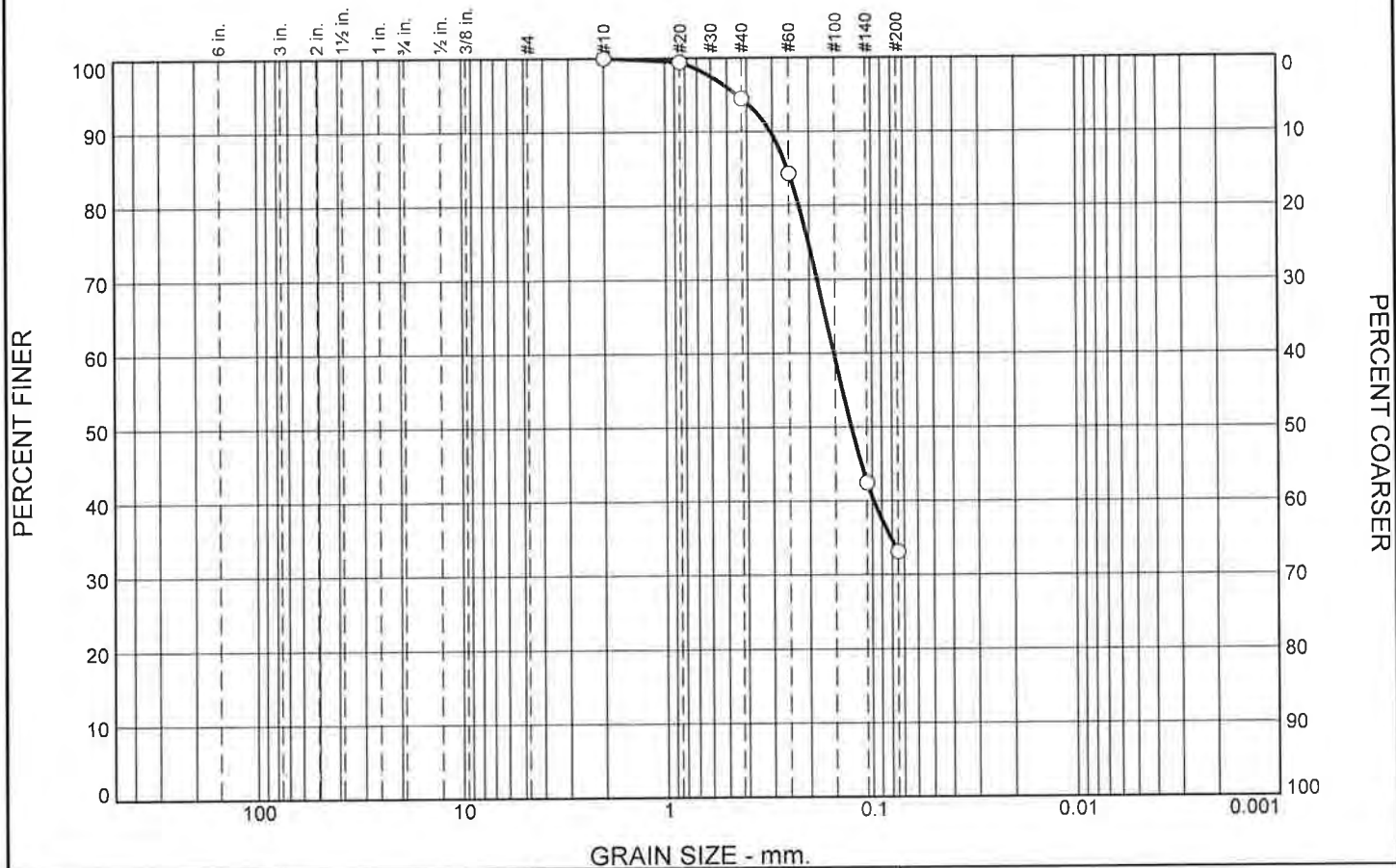


Client: URS/ARUP/HMM JV
Project: California High Speed Train

Project No: 2636-001.0

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	6	61	33	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	99		
#40	94		
#60	84		
#140	42		
#200	33		

* (no specification provided)

Soil Description

Brown silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D₉₀= 0.3075 D₈₅= 0.2550 D₆₀= 0.1527
D₅₀= 0.1262 D₃₀= D₁₅=
D₁₀= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

F.M.=0.54

Source of Sample: S0072R G-52675
Sample Number: U16

Depth: 70.0-72.0

Date: 11/27/13

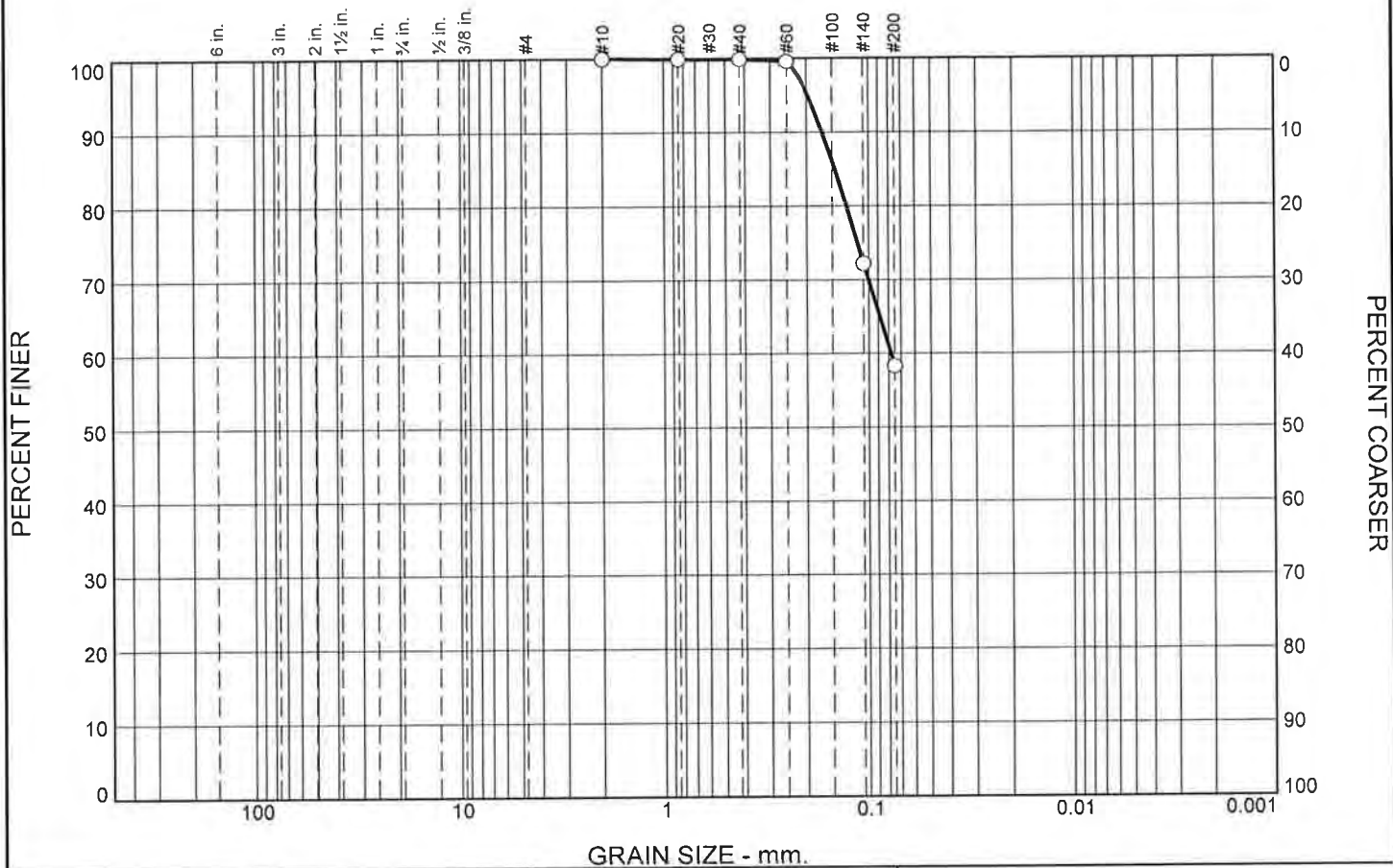


Client: URS/ARUP/HMM JV
Project: California High Speed Train

Project No: 2636-001.0

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	42	58	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	100		
#60	100		
#140	72		
#200	58		

* (no specification provided)

Soil Description		
Dark brown sandy silt		
Atterberg Limits		
PL=	LL=	PI=
Coefficients		
D ₉₀ = 0.1677	D ₈₅ = 0.1458	D ₆₀ = 0.0782
D ₅₀ =	D ₃₀ =	D ₁₅ =
D ₁₀ =	C _u =	C _c =
Classification		
USCS=	AASHTO=	
Remarks		
F.M.=0.14		

Source of Sample: S0072R G-52675
Sample Number: MC17-1

Depth: 76.0-76.5

Date: 11/10/13

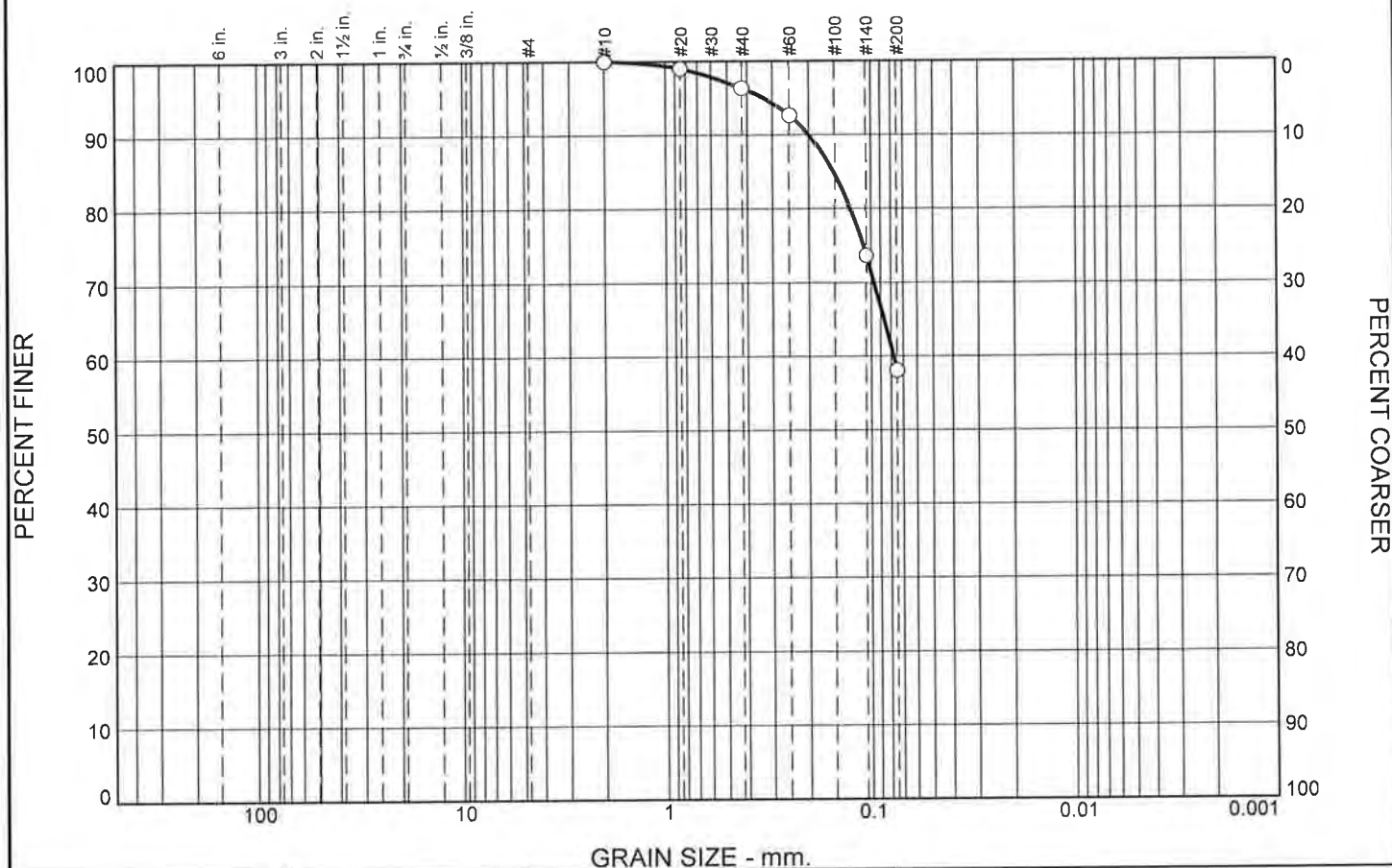


Client: URS/ARUP/HMM JV
Project: California High Speed Train

Project No: 2636-001.0

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	4	38	58	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	99		
#40	96		
#60	93		
#140	74		
#200	58		

* (no specification provided)

Soil Description
Olive brown sandy silt

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 0.2006 D₈₅= 0.1535 D₆₀= 0.0780
 D₅₀= D₃₀= D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= AASHTO=

Remarks
 F.M.=0.24

Source of Sample: S0072R G-52675
Sample Number: SS21

Depth: 96.0-96.5

Date: 11/04/13

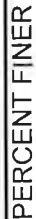


Client: URS/ARUP/HMM JV
Project: California High Speed Train

Project No: 2636-001.0

Figure

PERCENT COARSER



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	1	60	39

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100		
3/8	100		
#4	100		
#10	100		
#20	100		
#40	100		
#60	100		
#140	100		
#200	99		
0.0265 mm.	71		
0.0179 mm.	60		
0.0109 mm.	50		
0.0079 mm.	44		
0.0057 mm.	40		
0.0028 mm.	34		
0.0012 mm.	30		

(no specification provided)

Dark greenish gray clayey silt

Atterberg Limits

$$P| =$$

Coefficients

$$\begin{aligned} D_{60} &= 0.0181 \\ D_{15} &= \\ C_c &= \end{aligned}$$

Classification

F.M.=0.00

Remarks

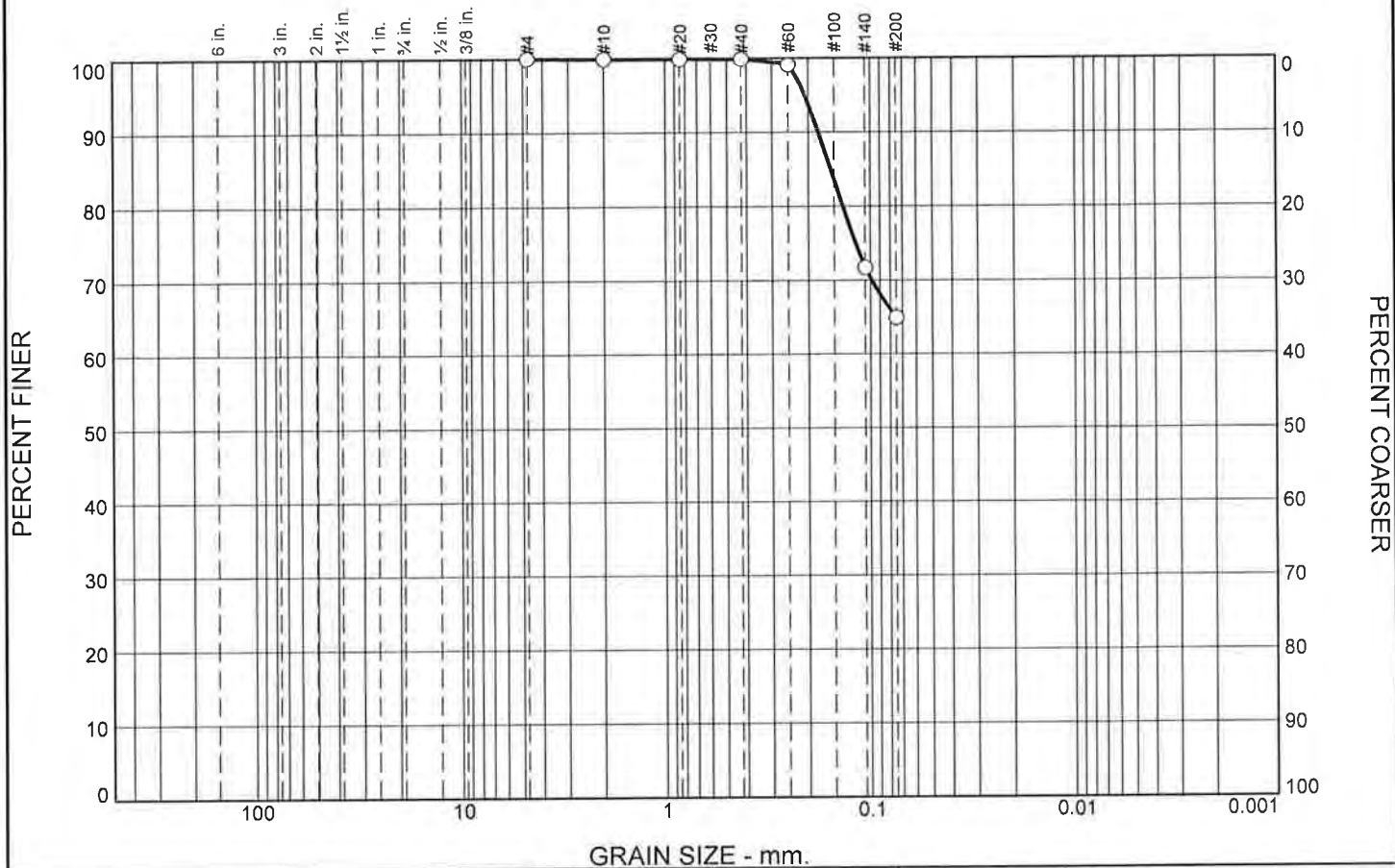
Depth: 110.5-111.0



Project No: 2636-001.0

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	35	65	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	100		
#40	100		
#60	99		
#140	72		
#200	65		

* (no specification provided)

Soil Description
Olive gray sandy clay

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= 0.1789 D₈₅= 0.1560 D₆₀=
 D₅₀= D₃₀= D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= AASHTO=

Remarks
 F.M.=0.17

Source of Sample: S0072R G-52675
Sample Number: SS25

Depth: 116.0-116.5

Date: 11/04/13

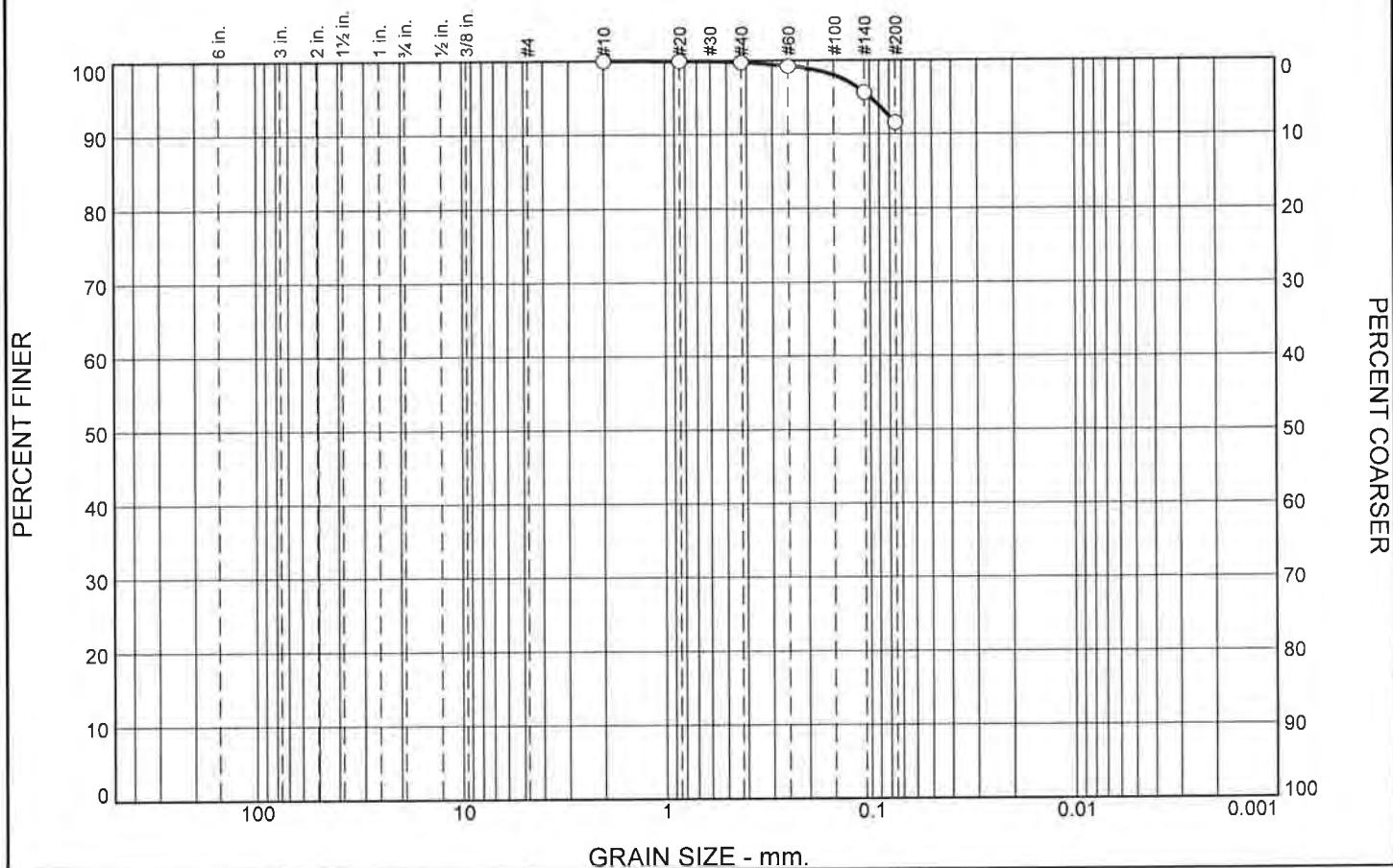


Client: URS/ARUP/HMM JV
Project: California High Speed Train

Project No: 2636-001.0

Figure

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	8	92	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	100		
#60	99		
#140	96		
#200	92		

* (no specification provided)

Soil Description
Greenish gray silt

Atterberg Limits
 PL= LL= PI=

Coefficients
 D₉₀= D₈₅= D₆₀=
 D₅₀= D₃₀= D₁₅=
 D₁₀= C_u= C_c=

Classification
 USCS= AASHTO=

Remarks
 F.M.=0.03

Source of Sample: S0072R G-52675
Sample Number: MC26-2

Depth: 120.5-121.0

Date: 11/08/13

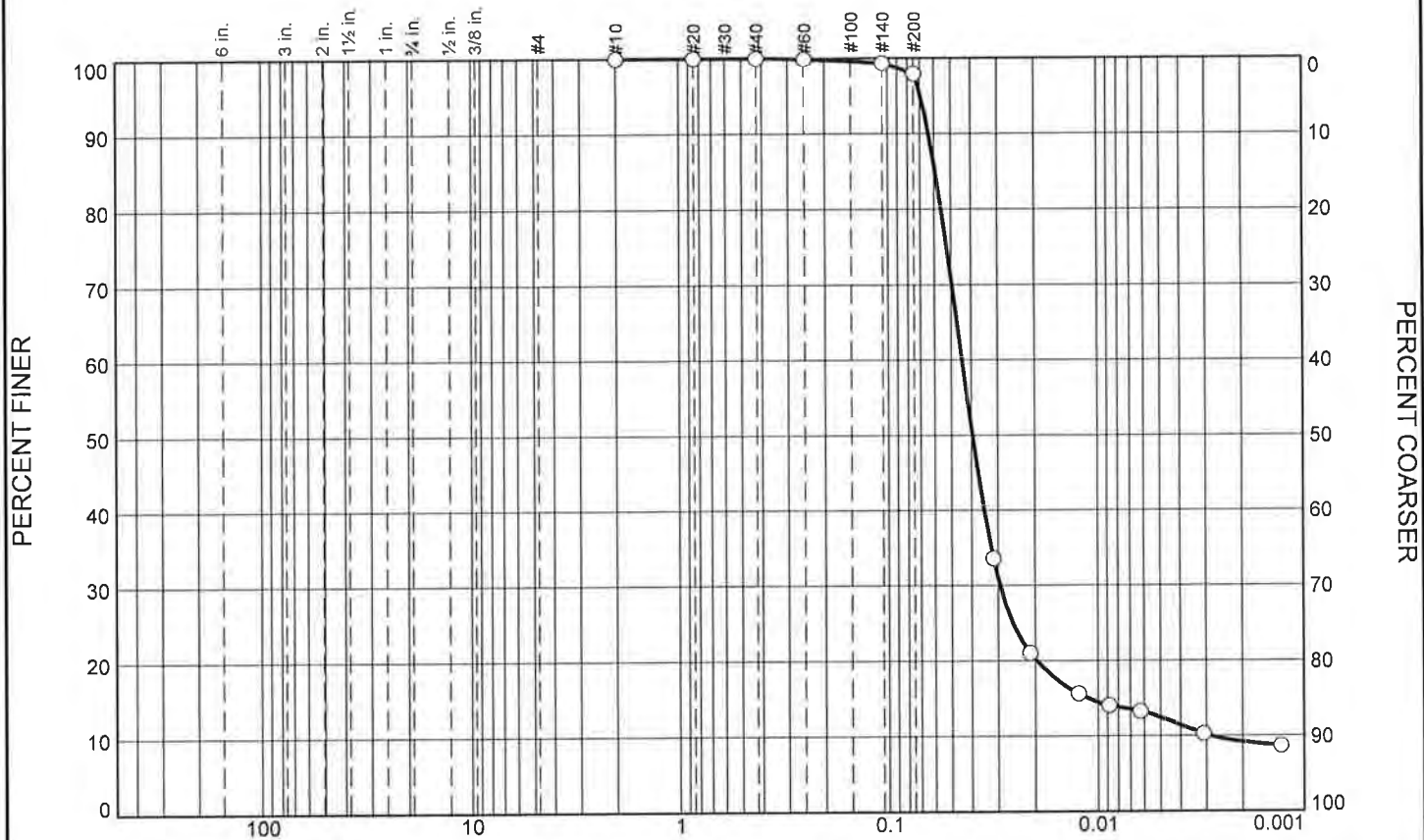


Client: URS/ARUP/HMM JV
Project: California High Speed Train

Project No: 2636-001.0

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	2	86	12

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	100		
#60	100		
#140	99		
#200	98		
0.0317 mm.	34		
0.0211 mm.	21		
0.0125 mm.	16		
0.0088 mm.	14		
0.0063 mm.	13		
0.0031 mm.	10		
0.0013 mm.	9		

* (no specification provided)

Soil Description
Grayish green silt

Atterberg Limits
 PL= LL= PI=
Coefficients
 D₉₀= 0.0637 D₈₅= 0.0592 D₆₀= 0.0443
 D₅₀= 0.0396 D₃₀= 0.0295 D₁₅= 0.0112
 D₁₀= 0.0028 C_u= 15.59 C_c= 6.93

Classification
USCS= AASHTO=

Remarks
F.M.=0.01

Source of Sample: S0072R G-52675
Sample Number: SS29

Depth: 136.0-136.5

Date: 10/29/13

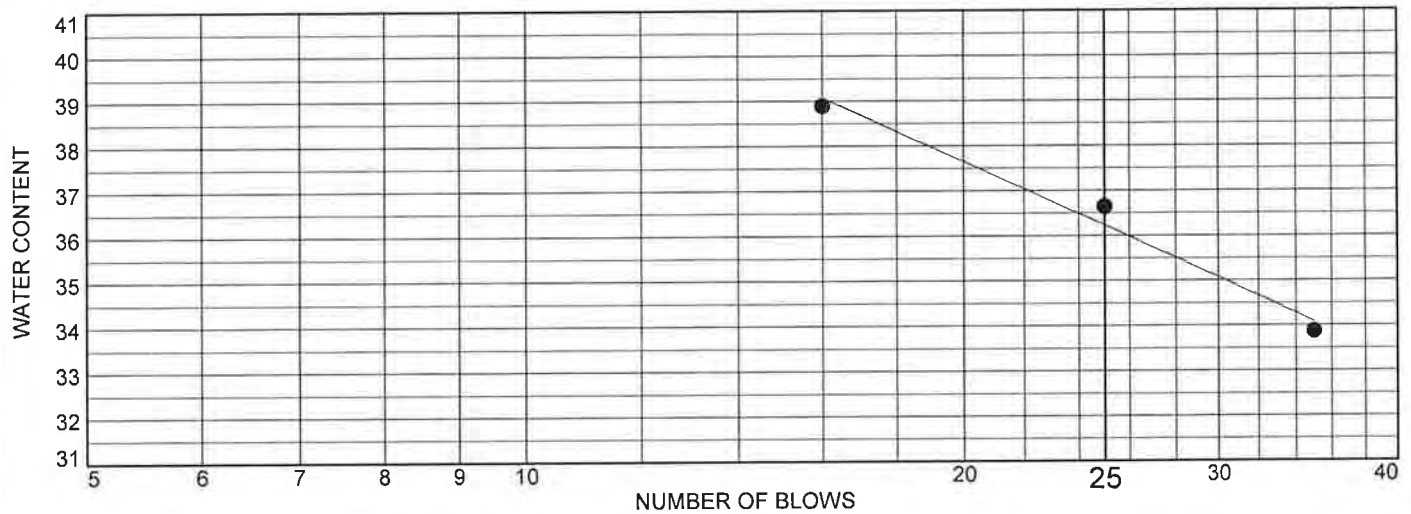
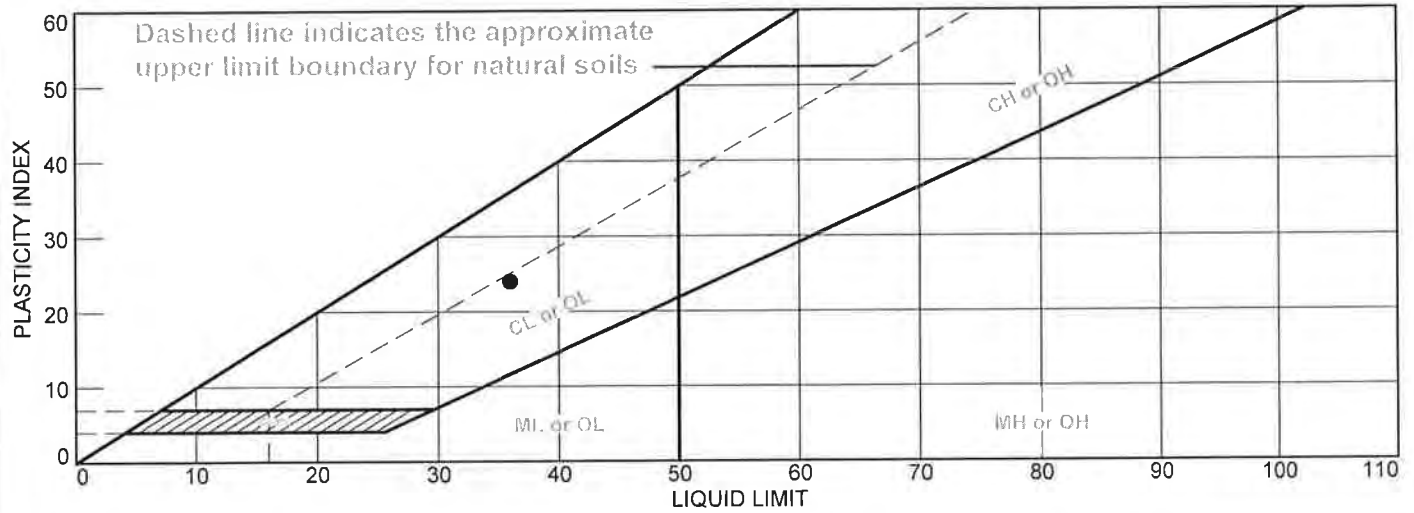


Client: URS/ARUP/HMM JV
Project: California High Speed Train

Project No: 2636-001.0

Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive gray sandy clay	36	12	24			

Project No. 2636-001.0 Client: URS/ARUP/HMM JV

Project: California High Speed Train

● Source: S0072R G-52675 Depth: 13.0-15.0 Sample No.: U5

Remarks:

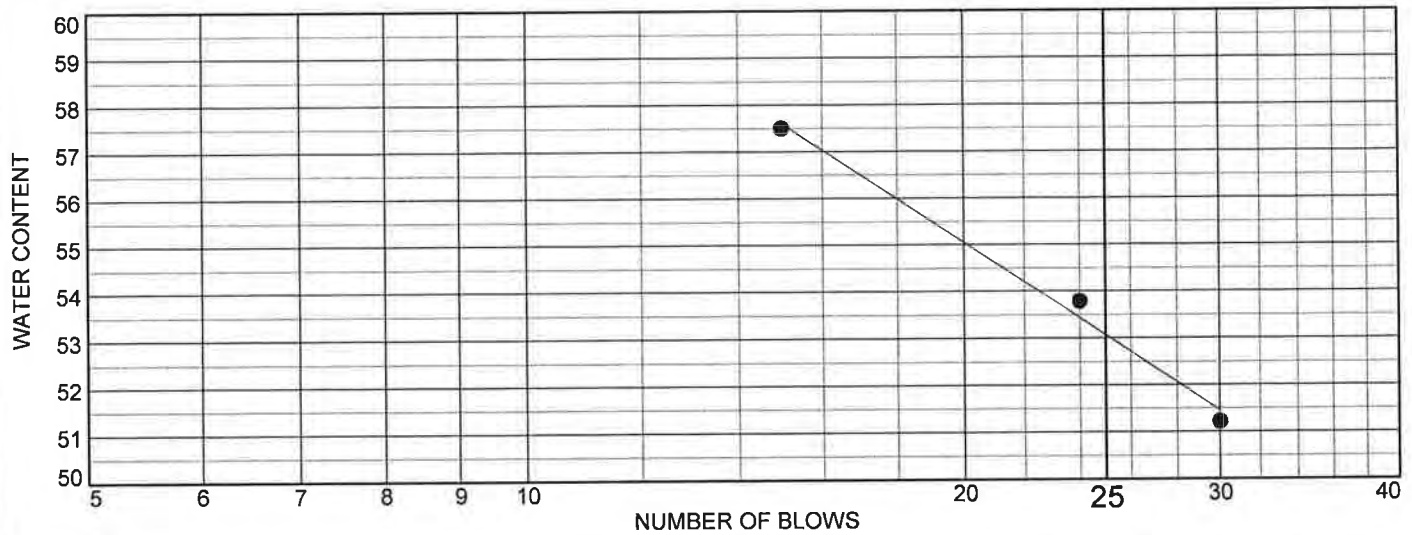
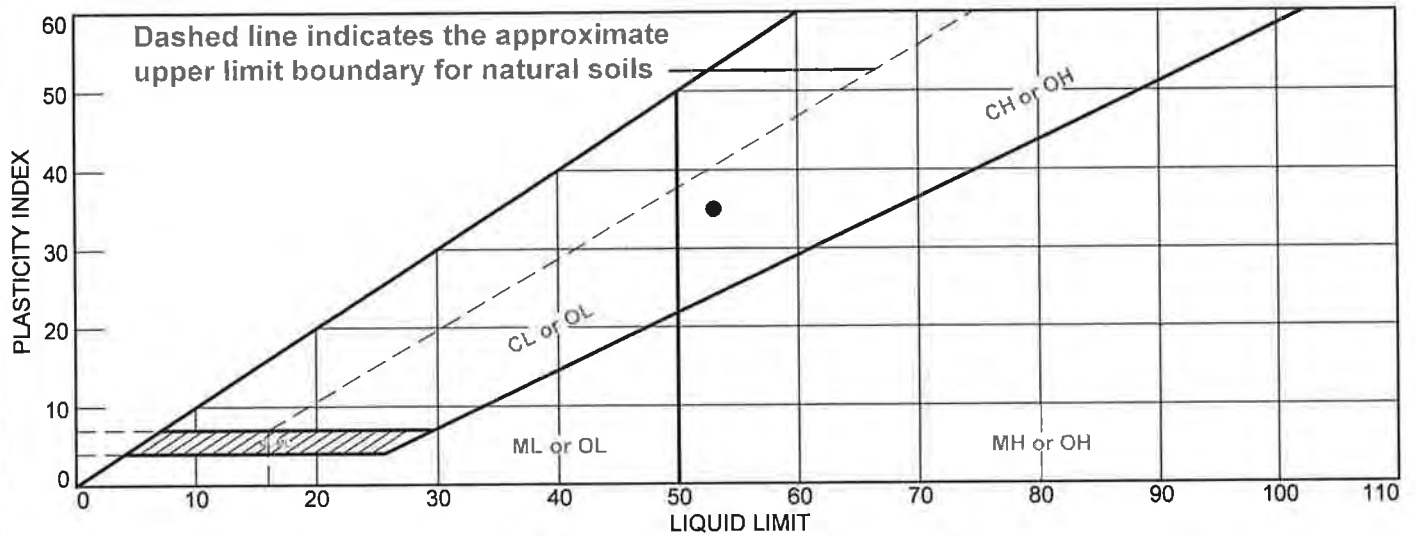


Figure

Tested By: JH

Checked By: PH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark grayish brown clay with sand	53	18	35			

Project No. 2636-001.0 **Client:** URS/ARUP/HMM JV

Project: California High Speed Train

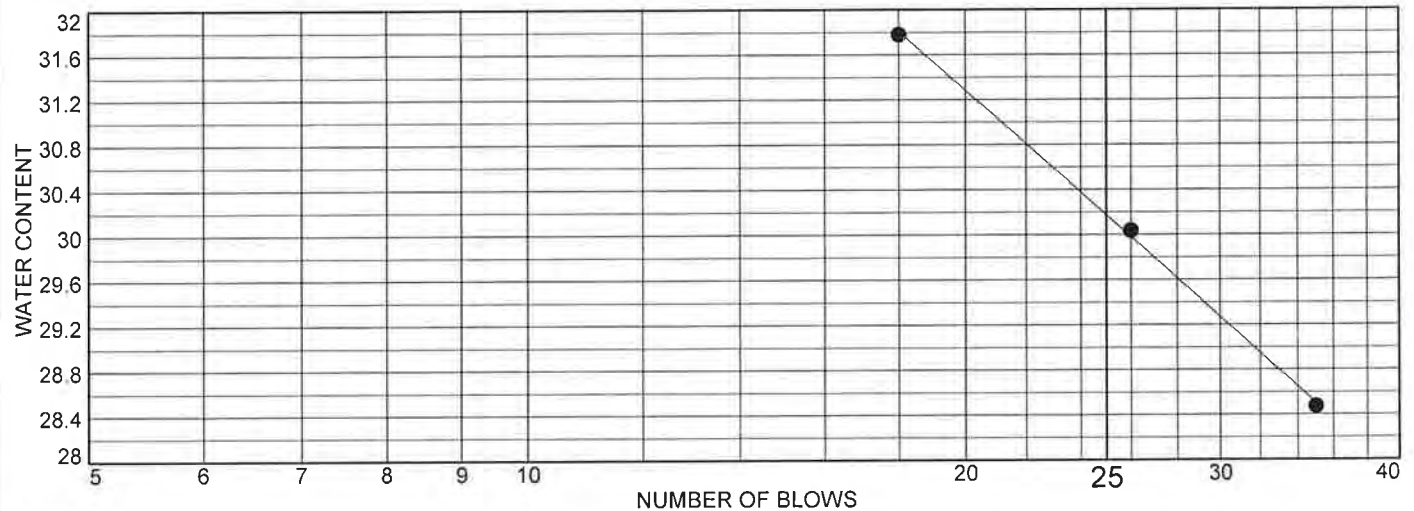
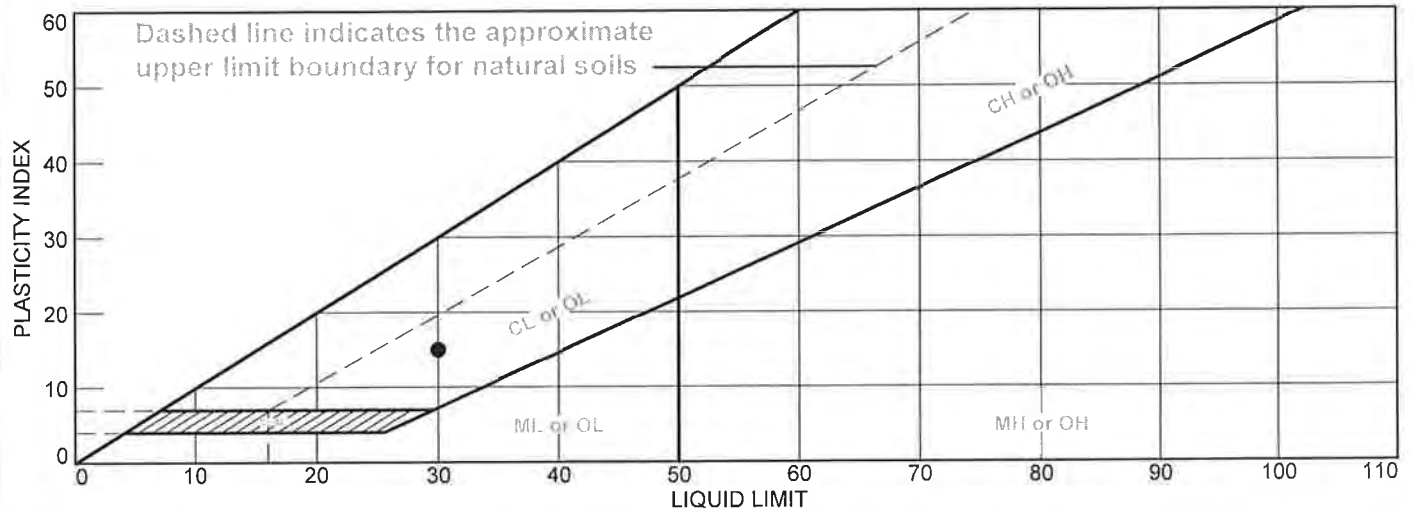
● **Source:** S0072R G-52675 **Depth:** 30.5-31.0 **Sample No.:** MC08-2

Remarks:



Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive brown sandy clay	30	15	15			

Project No. 2636-001.0 Client: URS/ARUP/HMM JV

Project: California High Speed Train

● Source: S0072R G-52675

Depth: 40.5-41.0

Sample No.: MC10-2

Remarks:

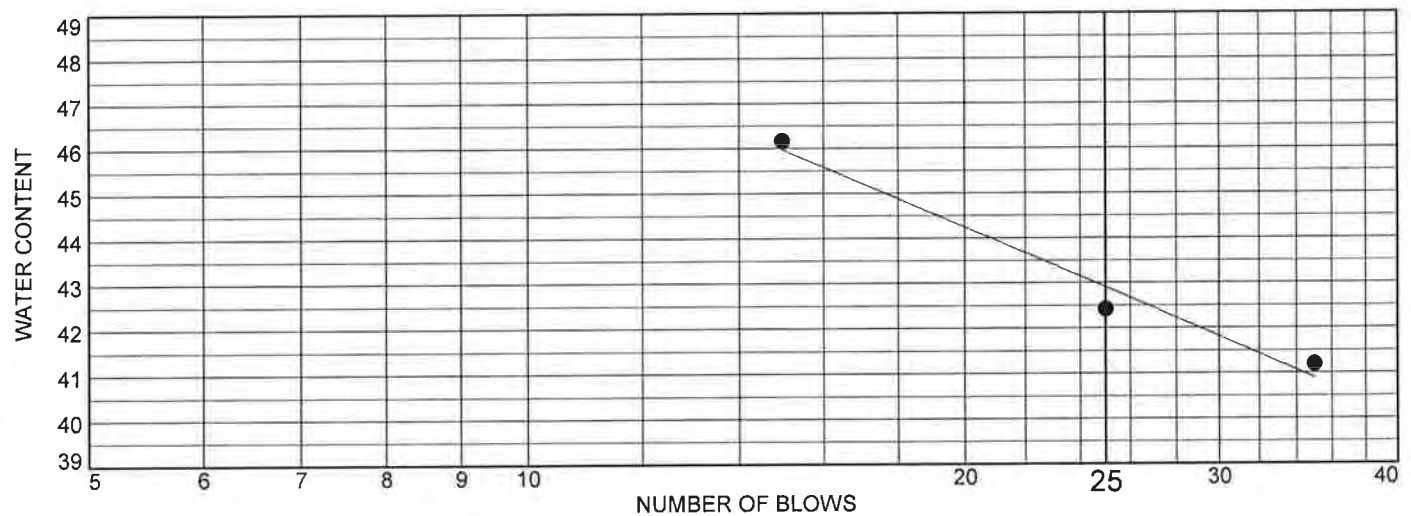
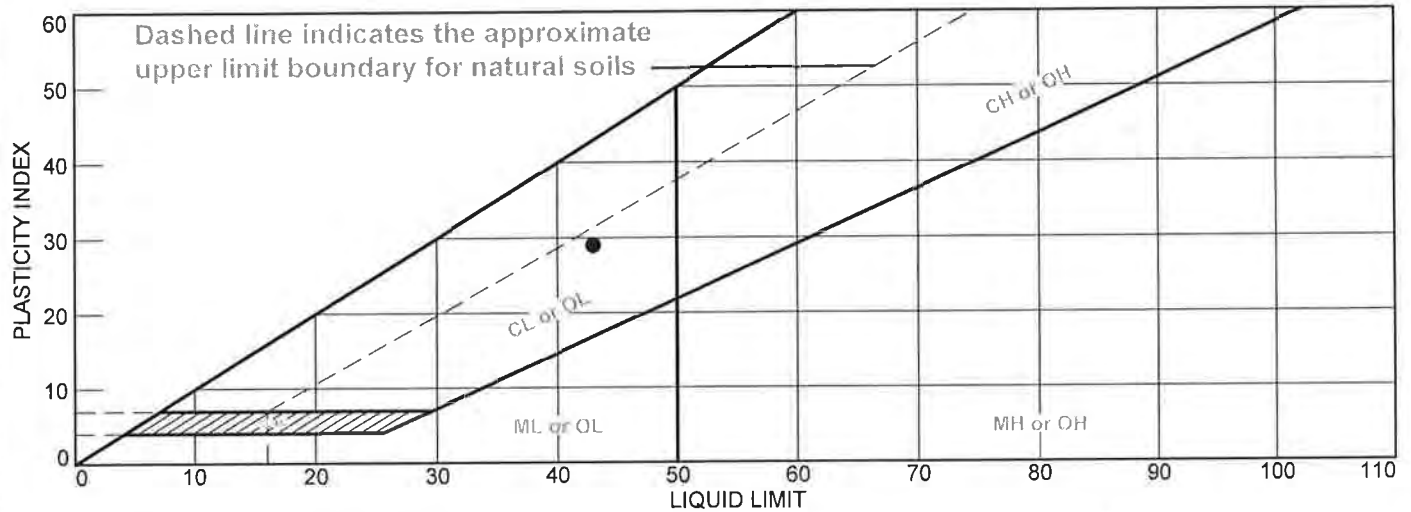


Figure

Tested By: JH

Checked By: PH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark grayish brown clay	43	14	29			

Project No. 2636-001.0 Client: URS/ARUP/HMM JV

Project: California High Speed Train

● Source: S0072R G-52675 Depth: 66.0-66.5 Sample No.: SS15

Remarks:

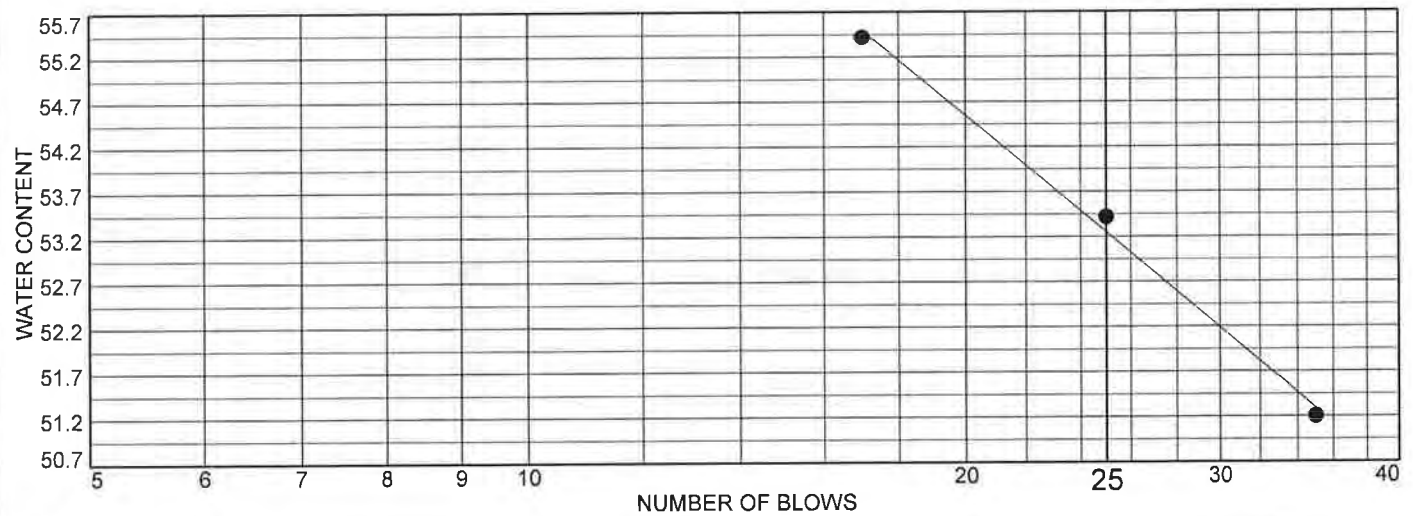
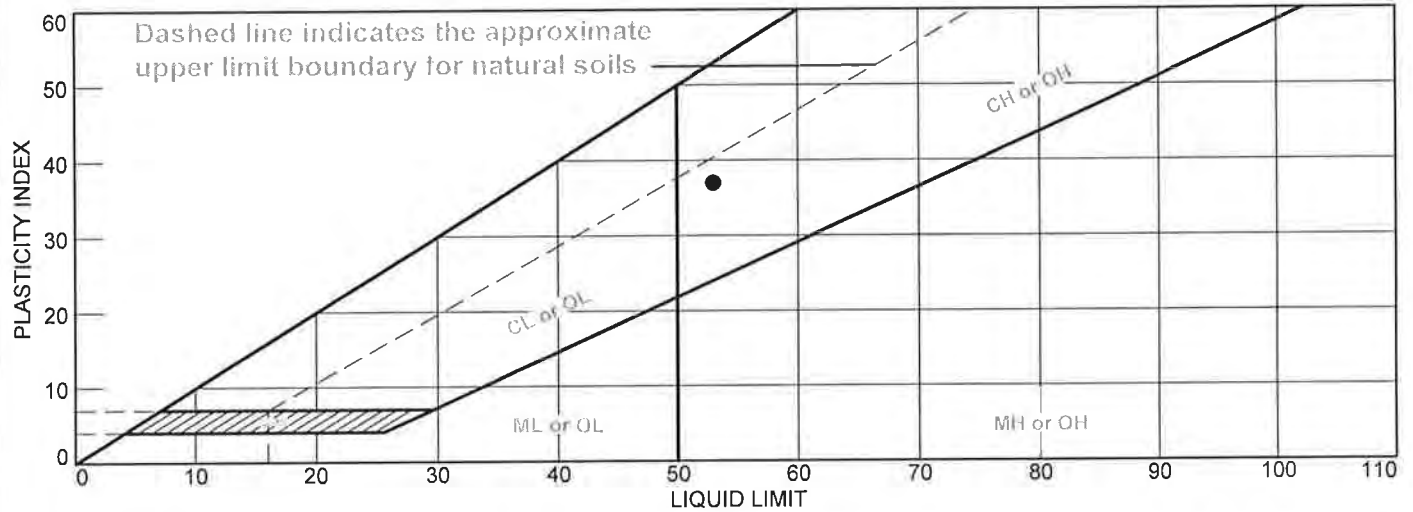


Figure

Tested By: JH

Checked By: PH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Light greenish gray silty clay	53	16	37			

Project No. 2636-001.0 Client: URS/ARUP/HMM JV

Project: California High Speed Train

● Source: S0072R G-52675 Depth: 80.0-82.0 Sample No.: U18

Remarks:

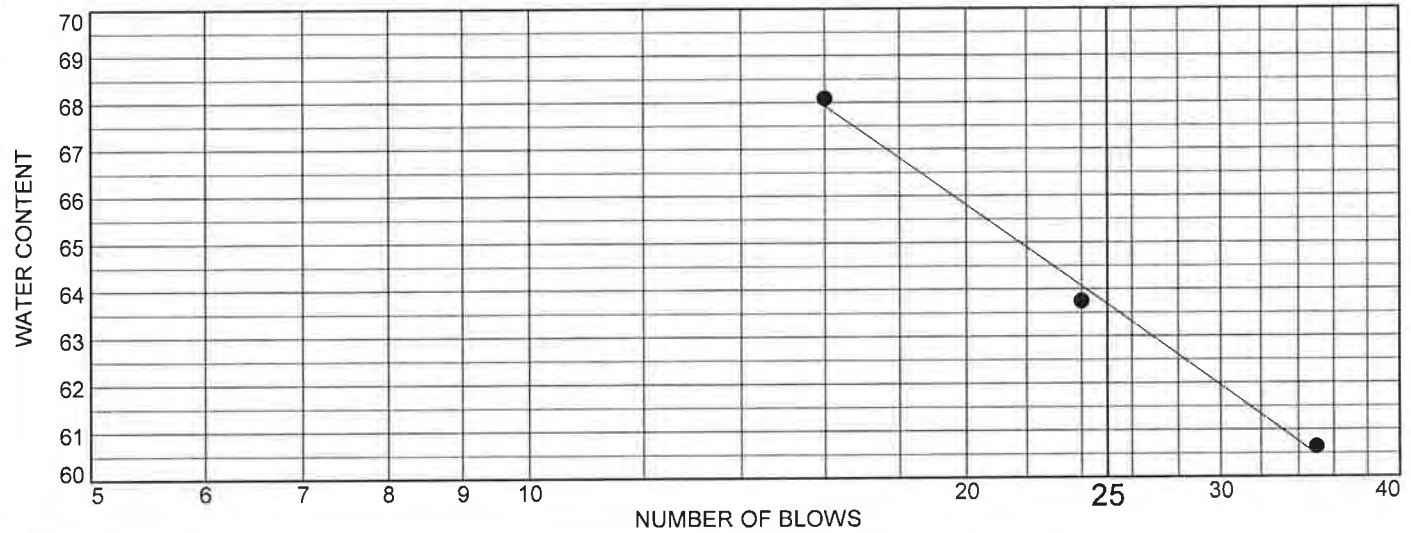
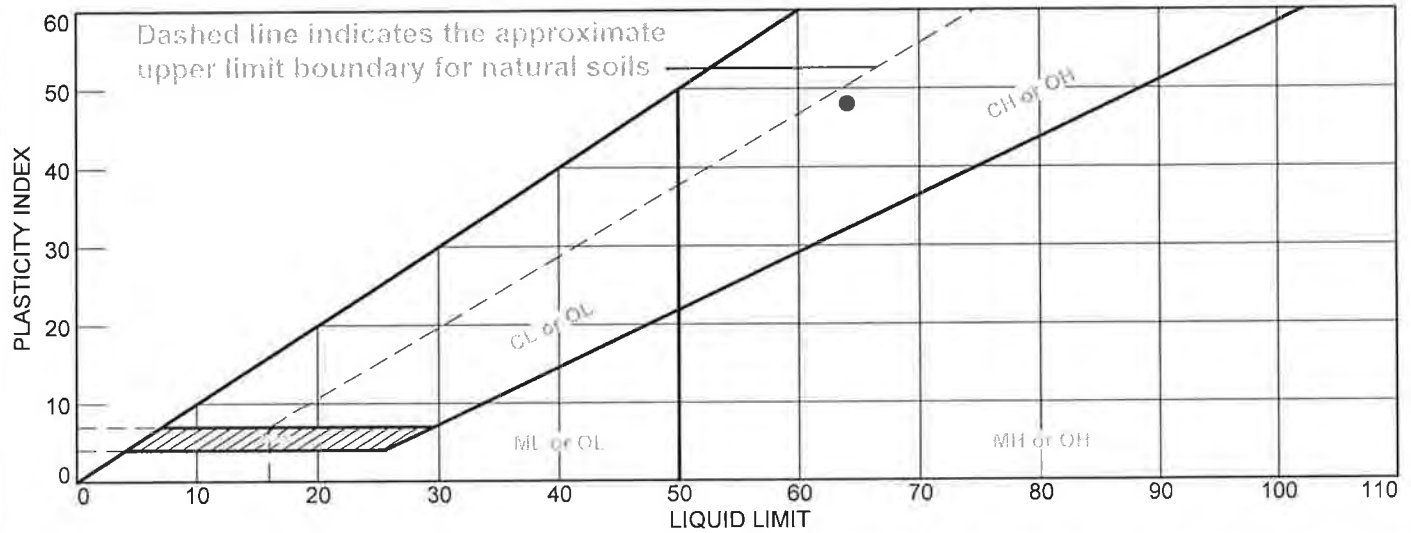


Figure

Tested By: JH

Checked By: PH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark grayish brown clay	64	16	48			

Project No. 2636-001.0 Client: URS/ARUP/HMM JV

Project: California High Speed Train

● Source: S0072R G-52675

Depth: 86.0-86.5

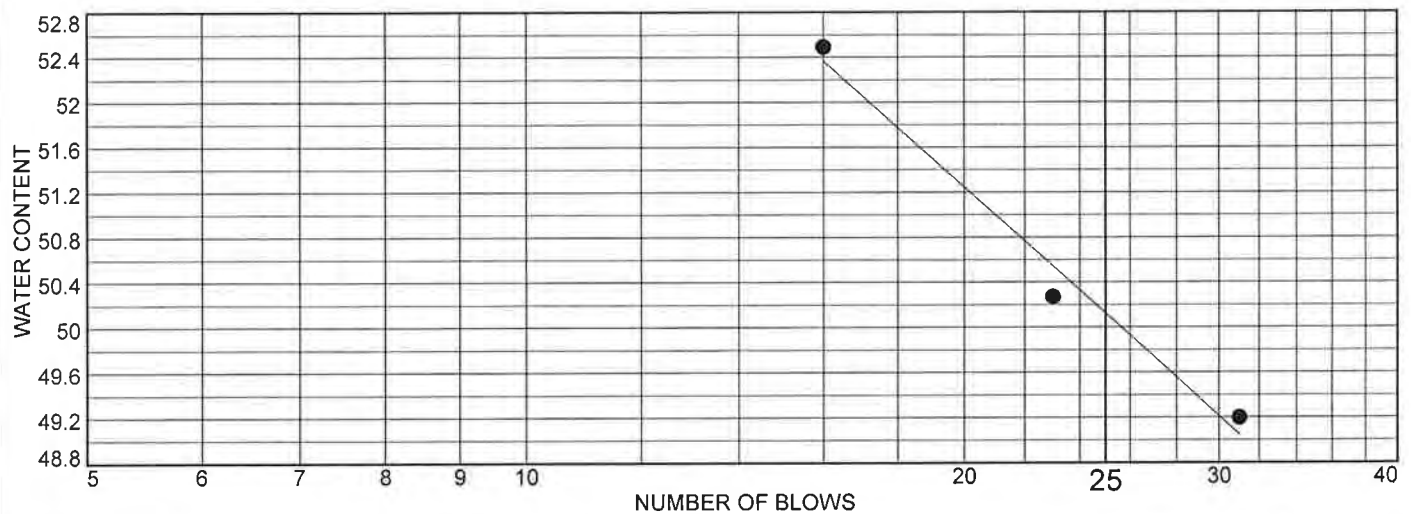
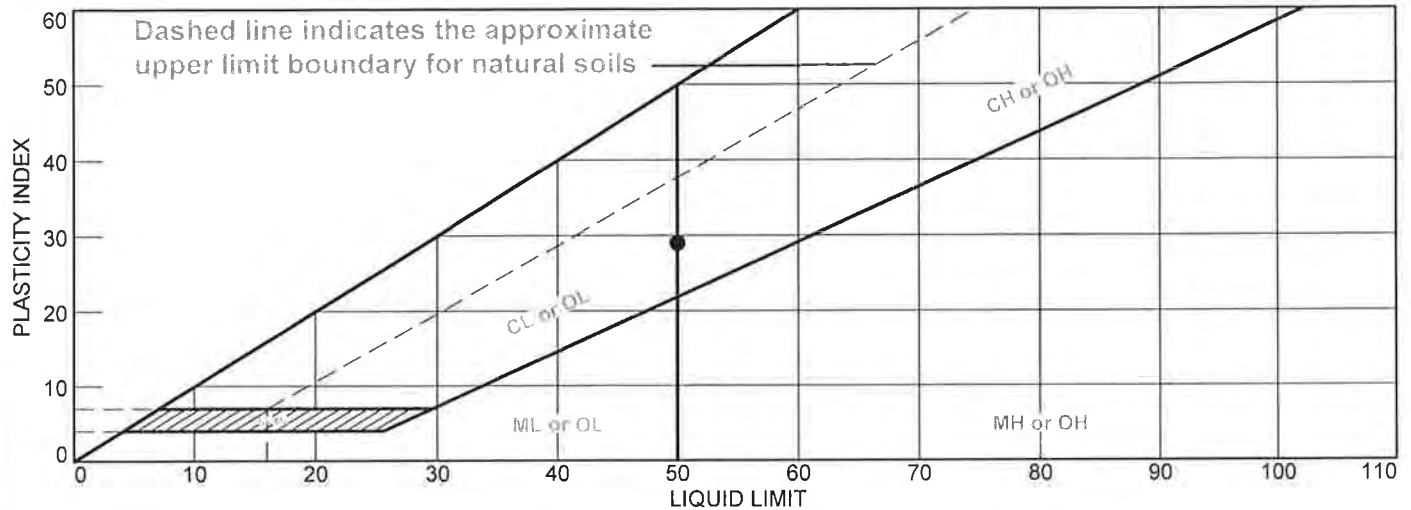
Sample No.: SS19

Remarks:



Figure

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive gray clay	50	21	29			

Project No. 2636-001.0 Client: URS/ARUP/HMM JV

Project: California High Speed Train

● Source: S0072R G-52675 Depth: 101.0-101.5 Sample No.: MC22-1

Remarks:

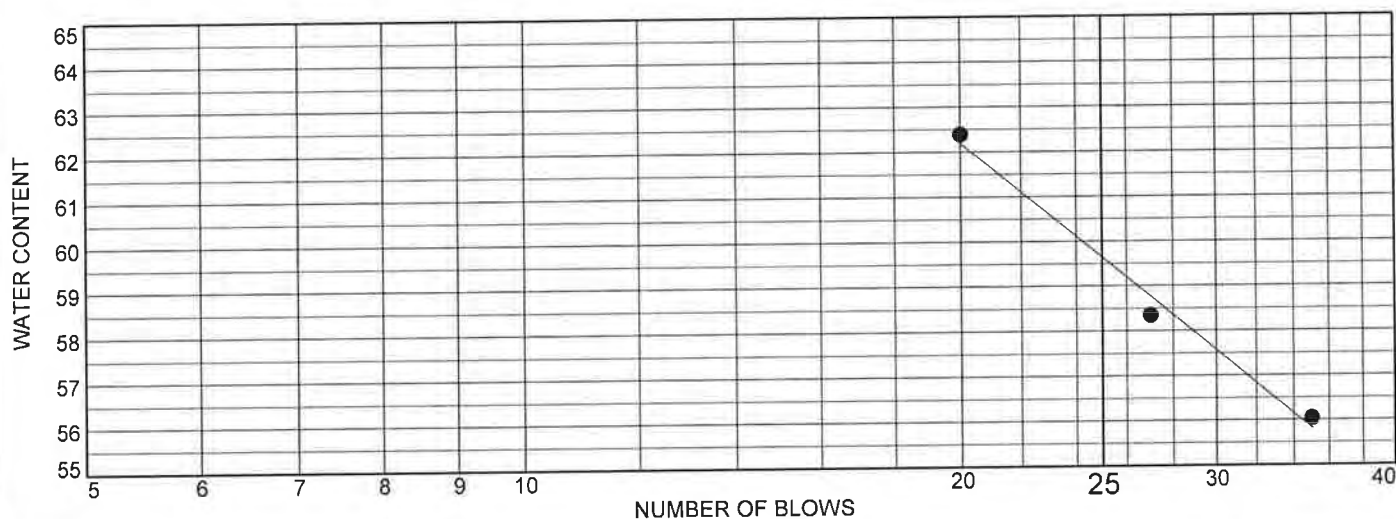
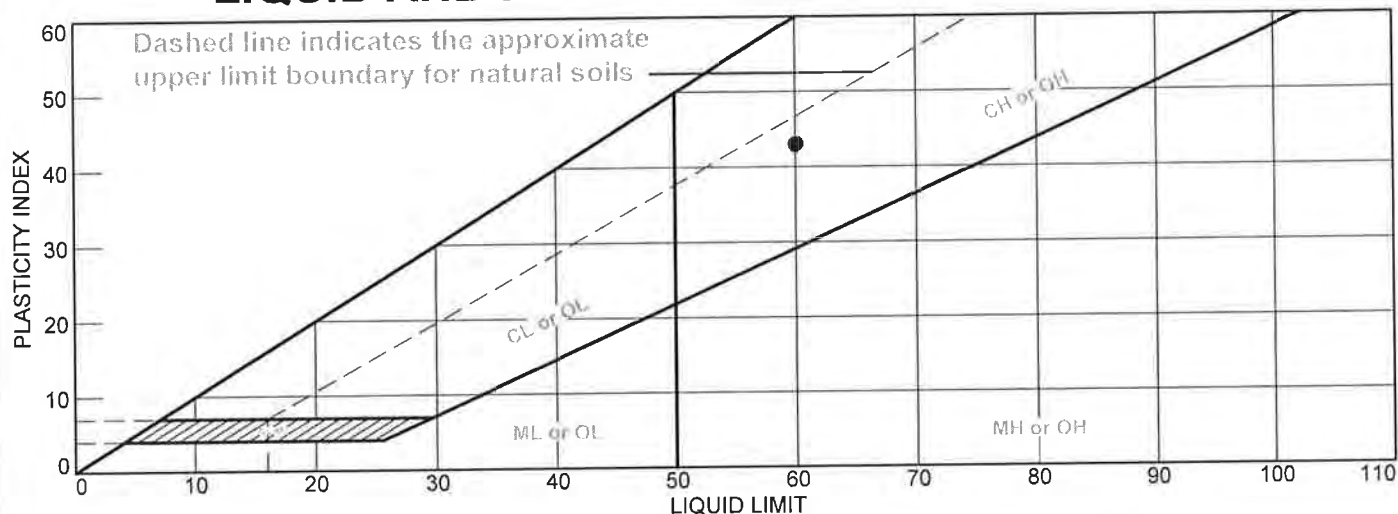


Figure

Tested By: JH

Checked By: PH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	60	17	43			

Project No. 2636-001.0 Client: URS/ARUP/HMM JV

Project: California High Speed Train

● Source: S0072R G-52675 Depth: 105.0-110.0 Sample No.: U23

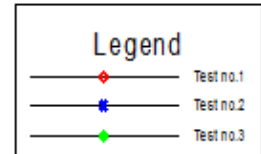
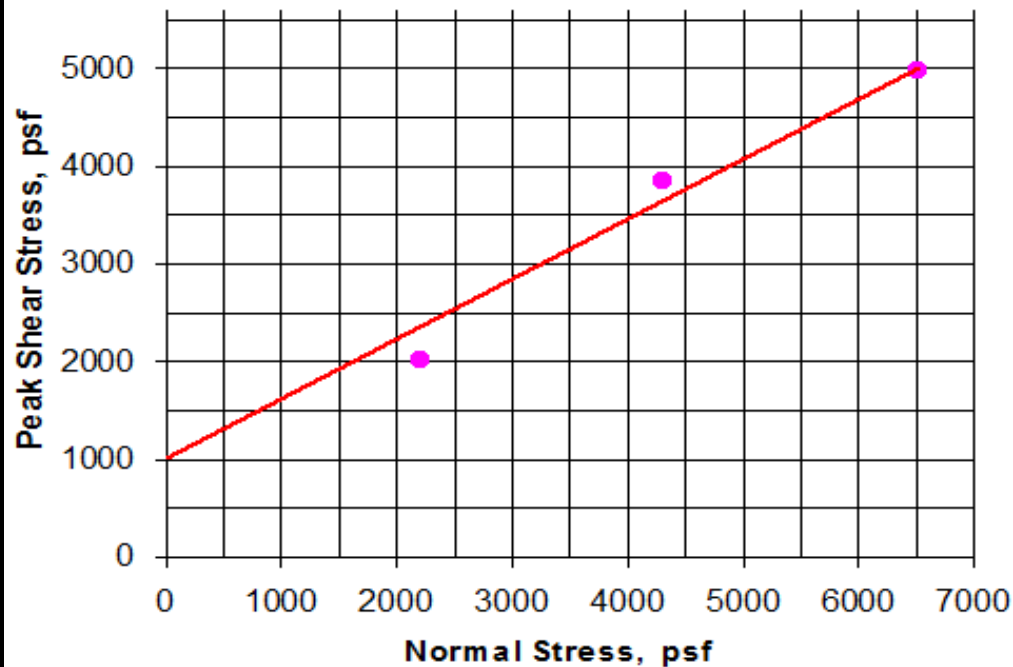
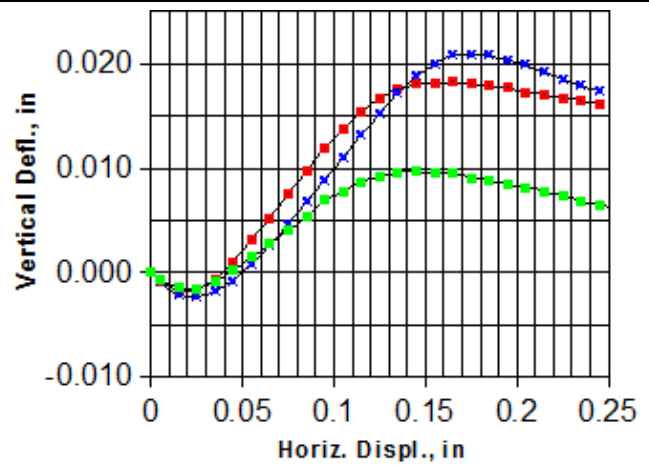
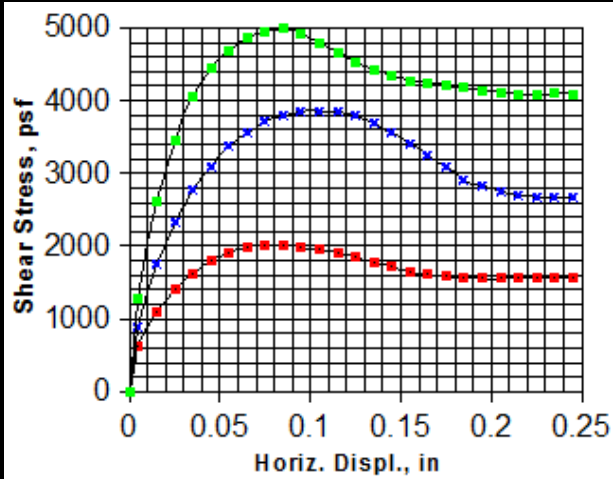


Remarks:

Figure

Tested By: JH

Checked By: PH



Results

C = 1000 psf
 $\phi = 32^\circ$

Gs = 2.70
 Type = undisturbed

Test no.	SigN psf	Peak Shear str., psf	Displ. in.	Strain Rate in./hr	Initial MC %	Initial DD pcf	Initial Sat. %	Initial Void Ratio	Initial Ht. in.	Initial Dia. in.	Final MC %	Final DD pcf	Final Sat. %	Final Void Ratio	Final Ht. in.
1	2200	2016	0.070	1.80	26.7	94.3	92	0.788	1.00	2.416	25.8	94.5	89	0.784	0.998
2	4300	3864	0.100	0.18	25.3	90.2	79	0.869	1.00	2.416	25.4	90.5	80	0.862	0.996
3	6500	4992	0.085	0.18	19.8	105.2	89	0.603	1.00	2.416	18.0	107.9	86	0.563	0.975

Client: **URS/ARUP/HMM JV**

Boring #: **S0072R**

Sample #: **MC04-1**

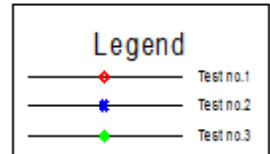
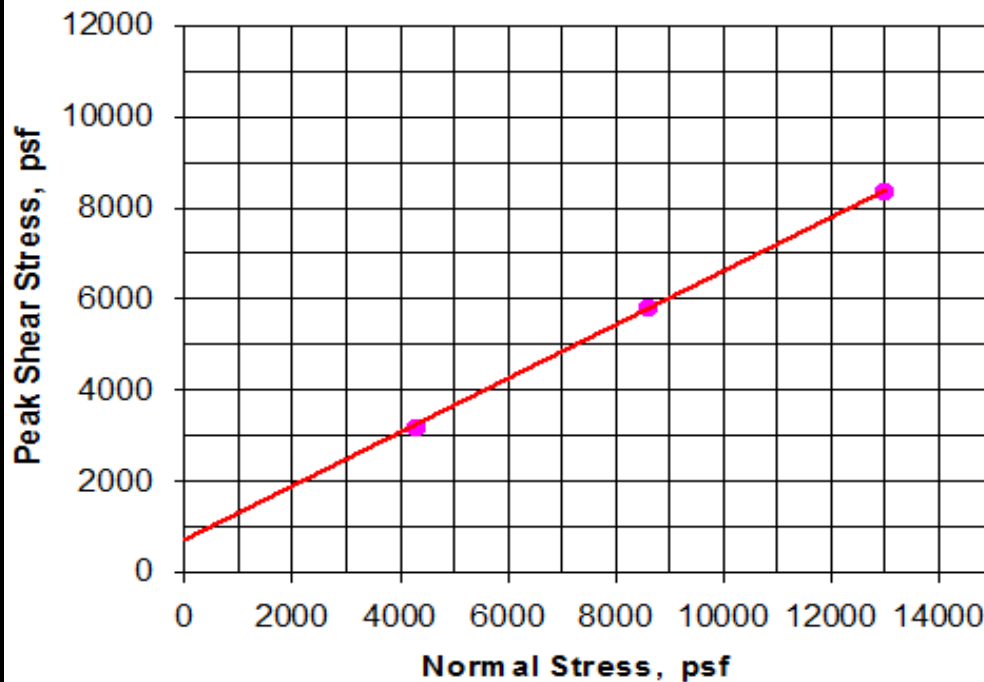
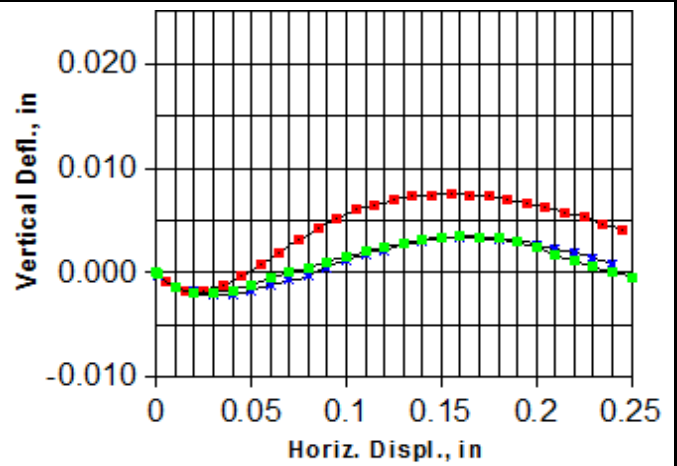
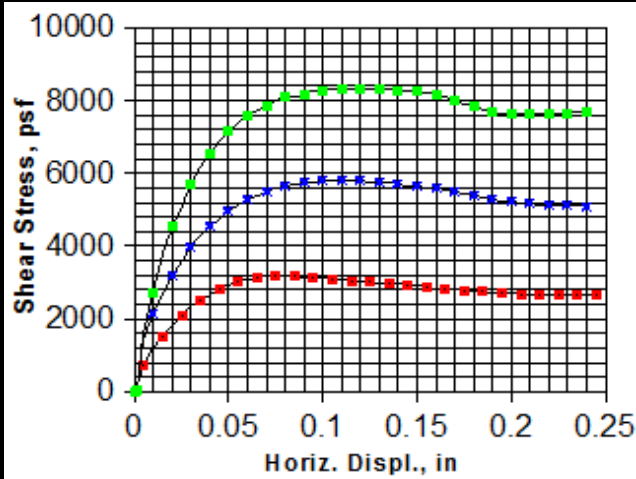
Project: **California High Speed Train**

Depth (ft): **11-11.5**

Project #: **2636-001.0**

Soil: **Greenish gray sand**

TEST REPORT: Direct shear - inundated, consolidated, & drained test



Results

C = 700 psf
phi = 30 deg.

Gs = 2.70
Type = undisturbed

Test no.	SigN psf	Peak Shear str., psf	Displ. in.	Strain Rate in./hr	Initial MC %	Initial DD pcf	Initial Sat. %	Initial Void Ratio	Initial Ht. in.	Initial Dia. in.	Final MC %	Final DD pcf	Final Sat. %	Final Void Ratio	Final Ht. in.
1	4300	3180	0.075	0.18	18.9	98.2	71	0.717	1.00	2.416	21.6	101.0	87	0.669	0.972
2	8600	5796	0.105	0.18	17.0	101.7	70	0.657	1.00	2.416	19.1	106.4	88	0.584	0.956
3	13000	8339	0.115	0.18	17.7	106.8	83	0.578	1.00	2.416	17.7	112.6	96	0.497	0.949

Client: **URS/ARUP/HMM JV**

Boring #: **S0072R**

Sample #: **U16**

Project: **California High Speed Train**

Depth (ft): **70-72**

Project #: **2636-001.0**

Soil: **Brown silty sand**

TEST REPORT: Direct shear - inundated, consolidated, & drained test

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : URS/ARUP/HMM JV
 Project : California High Speed Train
 Job # : 2636-001.0
 Boring # : S0072R
 Sample # : MC06-1
 Depth (ft) : 21
 Date tested : 11/13/13
 Soil : Grayish brown sandy clay

Data Reduction:

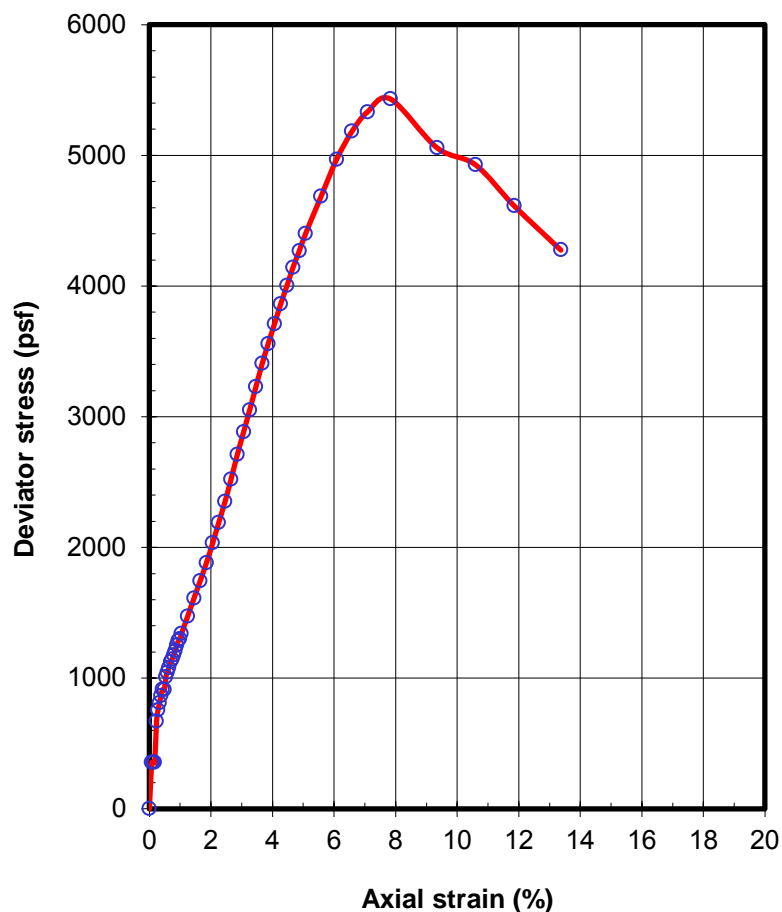
Dial factor = 1.0 in/unit
 Load factor = 1.0 lb/unit

Specimen: Total wt. = 948.4 gms
 Ht. = 5.820 in
 Ave dia. = 2.420 in
 Area = 4.601 sq.in
 Volume = 438.9 c.c.
 Shearing rate = 0.04 inch/min
 Shearing rate = 0.75 %/min
 Gs (assumed) = 2.70

Test Report:

Void ratio = 0.447
 Ht/Dia ratio = 2.40
 Moisture = 15.8 %
 Total density = 134.8 pcf
 Dry density = 116.4 pcf
 Saturation = 95.5 %
 Chamber pressure = 2880 psf
 Max. deviator stress = 5432 psf
 Strain @ failure = 7.83 %

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	11.3	0.08	354.1
0.005	11.3	0.12	354.0
0.008	11.3	0.17	353.8
0.012	21.4	0.23	668.6
0.015	24.2	0.28	755.7
0.017	26.0	0.33	810.8
0.020	27.7	0.38	864.6
0.023	29.3	0.43	911.8
0.026	29.3	0.49	911.2
0.029	32.4	0.53	1008.3
0.032	33.5	0.58	1043.7
0.035	34.6	0.63	1076.8
0.038	36.1	0.69	1122.4
0.041	36.9	0.74	1144.7
0.044	37.9	0.79	1175.8
0.047	38.9	0.84	1206.7
0.050	40.3	0.89	1249.8
0.053	41.5	0.94	1285.7
0.056	41.9	0.99	1298.2
0.059	43.2	1.04	1338.0
0.071	47.6	1.24	1472.4
0.082	52.2	1.45	1609.7
0.094	56.6	1.65	1742.9
0.106	61.2	1.85	1881.2
0.118	66.3	2.06	2033.5
0.129	71.6	2.25	2189.1
0.141	77.0	2.46	2349.1
0.153	82.7	2.65	2519.8
0.165	89.1	2.86	2709.8
0.176	95.1	3.06	2883.8
0.188	100.7	3.26	3049.7
0.200	106.9	3.46	3228.4
0.211	113.0	3.66	3405.8
0.223	118.2	3.86	3557.5
0.235	123.6	4.06	3709.4
0.247	128.9	4.27	3862.3
0.258	133.9	4.47	4004.1
0.270	138.8	4.67	4142.4
0.282	143.4	4.87	4268.3
0.293	148.1	5.07	4400.4
0.323	158.6	5.58	4685.9
0.352	169.1	6.08	4968.7
0.381	177.3	6.58	5182.3
0.410	183.4	7.08	5331.9
0.454	188.3	7.83	5431.7
0.542	178.3	9.35	5058.2
0.615	176.1	10.59	4928.1
0.688	167.2	11.85	4613.5



G-52675

S0072R

MC06-1

21-21.5

TXUW

1000

G-52675
S0072R
Mc06-1
21-21.5
Txuu

1000



G-52675
S0072R
Mc06-1
21-21.5
Txuu

1000



G-52675
S0072R
Mc06-1
21-21.5
Txuu

1000

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : URS/ARUP/HMM JV
 Project : California High Speed Train
 Job # : 263-001.0
 Boring # S0072R
 Sample # : MC08-1
 Depth (ft) : 31
 Date tested : 11/13/13
 Soil : Grayish brown sandy clay

Data Reduction:

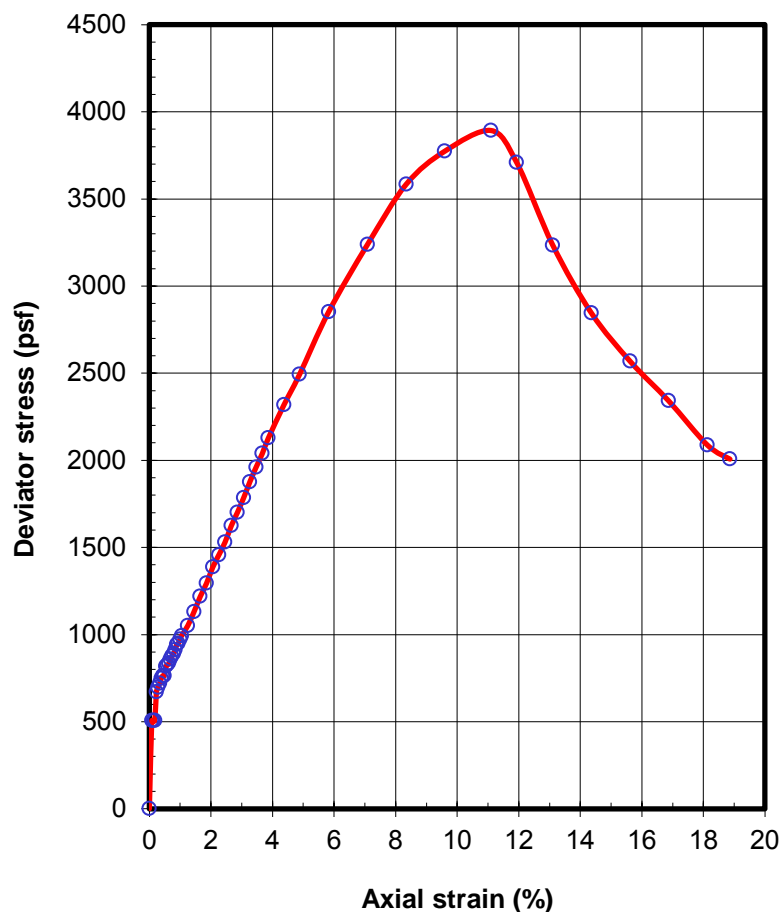
Dial factor = 1.0 in/unit
 Load factor = 1.0 lb/unit

Specimen: Total wt. = 918.4 gms
 Ht. = 5.680 in
 Ave dia. = 2.420 in
 Area = 4.601 sq.in
 Volume = 428.3 c.c.
 Shearing rate = 0.04 inch/min
 Shearing rate = 0.75 %/min
 Gs (assumed) = 2.70

Test Report:

Void ratio = 0.483
 Ht/Dia ratio = 2.35
 Moisture = 17.8 %
 Total density = 133.8 pcf
 Dry density = 113.6 pcf
 Saturation = 99.5 %
 Chamber pressure = 5040 psf
 Max. deviator stress = 3893 psf
 Strain @ failure = 11.10 %

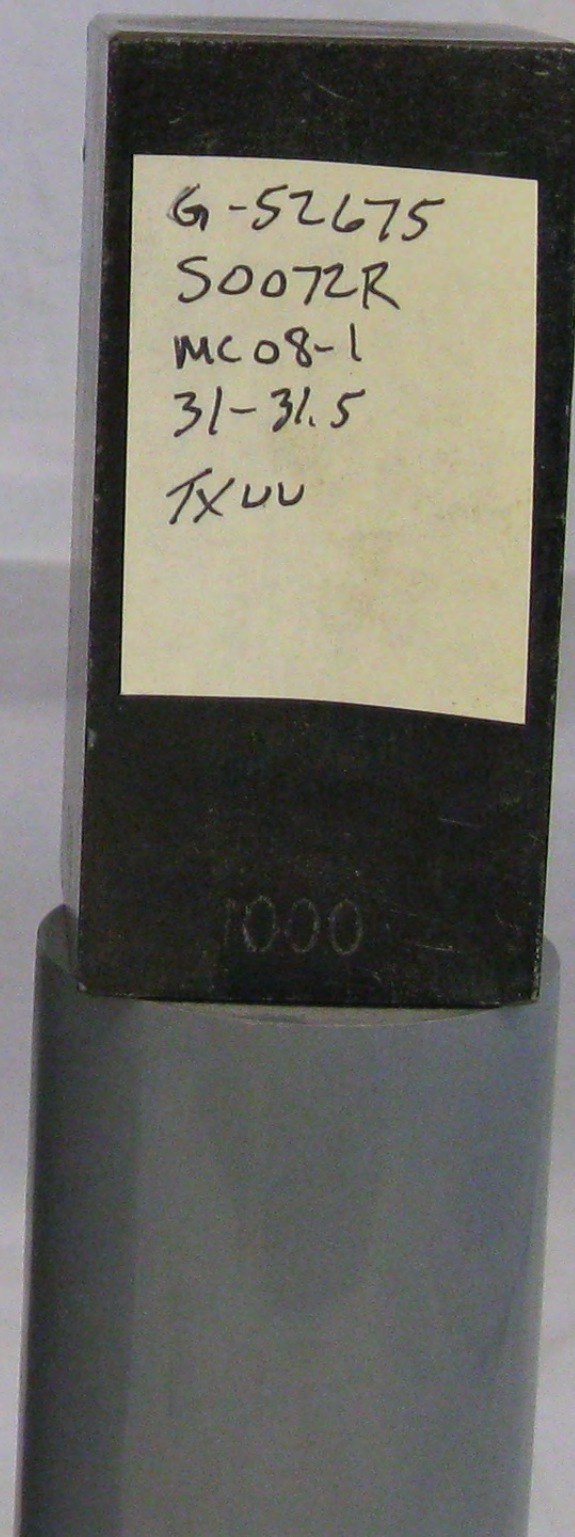
Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.002	16.2	0.08	505.6
0.005	16.2	0.13	505.3
0.008	16.2	0.18	505.1
0.011	21.4	0.23	669.0
0.014	22.3	0.28	695.2
0.017	23.1	0.34	720.1
0.020	24.0	0.38	746.6
0.023	24.5	0.43	763.5
0.025	24.5	0.48	763.1
0.029	26.3	0.54	817.5
0.031	26.5	0.59	825.3
0.034	26.9	0.64	835.1
0.037	27.6	0.69	857.4
0.040	28.2	0.74	874.7
0.043	28.7	0.79	889.6
0.046	29.4	0.84	911.0
0.048	30.3	0.89	941.3
0.051	30.6	0.94	947.6
0.055	31.4	0.99	972.2
0.057	32.0	1.04	992.1
0.069	34.0	1.25	1050.5
0.080	36.7	1.45	1130.5
0.092	39.6	1.65	1218.1
0.103	42.1	1.86	1293.7
0.115	45.2	2.06	1386.2
0.126	47.6	2.25	1455.9
0.138	50.1	2.46	1529.9
0.149	53.3	2.66	1624.3
0.160	55.9	2.86	1699.1
0.172	58.8	3.06	1783.5
0.183	62.0	3.26	1875.8
0.195	64.9	3.47	1960.0
0.207	67.6	3.67	2039.3
0.218	70.7	3.87	2127.4
0.246	77.4	4.37	2317.6
0.275	83.7	4.88	2491.9
0.329	96.8	5.82	2851.5
0.400	111.3	7.08	3237.8
0.472	124.9	8.34	3584.0
0.543	133.4	9.60	3774.1
0.629	139.9	11.10	3892.8
0.676	134.6	11.93	3709.5
0.742	118.9	13.11	3234.3
0.814	106.1	14.36	2843.8
0.886	97.2	15.62	2567.1
0.956	90.0	16.87	2341.1
1.028	81.5	18.13	2087.0
1.069	79.0	18.86	2007.0





G-52675
S0072R
MC08-1
31-31.5
TXUU

1000



G-52675
S0072R
MC08-1
31-31.5
TXUU

1000



G-52675
S0072R
MC08-1
31-31.5
TXUU

1000



G-52675
S0072R
MC08-1
31-31.5
TXUU

1000

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : URS/ARUP/HMM JV
 Project : California High Speed Train
 Job # : 2636-001.0
 Boring # : S0072R
 Sample # : MC10-1
 Depth (ft) : 41.0-41.5
 Date tested : 11/23/13
 Soil : Grayish brown sandy clay

Data Reduction:

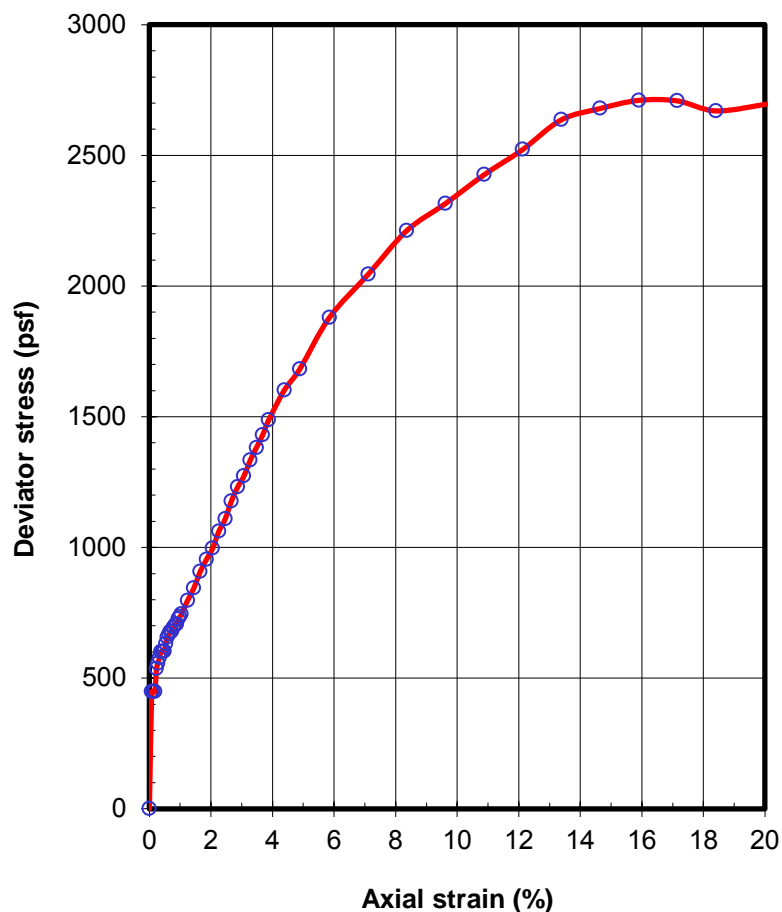
Dial factor = 1.0 in/unit
 Load factor = 1.0 lb/unit

Specimen: Total wt. = 943.7 gms
 Ht. = 6.000 in
 Ave dia. = 2.430 in
 Area = 4.640 sq.in
 Volume = 456.2 c.c.
 Shearing rate = 0.05 inch/min
 Shearing rate = 0.75 %/min
 Gs (assumed) = 2.70

Test Report:

Void ratio = 0.587
 Ht/Dia ratio = 2.47
 Moisture = 21.6 %
 Total density = 129.1 pcf
 Dry density = 106.2 pcf
 Saturation = 99.4 %
 Chamber pressure = 5760 psf
 Max. deviator stress = 2711 psf
 Strain @ failure = 15.90 %

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	14.5	0.07	448.6
0.006	14.5	0.12	448.4
0.009	14.5	0.18	448.1
0.012	17.3	0.23	535.2
0.015	18.0	0.28	556.6
0.018	18.7	0.33	577.1
0.021	19.4	0.38	600.4
0.024	19.5	0.43	602.2
0.027	19.5	0.48	601.9
0.030	20.4	0.53	630.3
0.033	21.2	0.58	654.8
0.036	21.6	0.64	667.0
0.039	22.0	0.69	677.9
0.042	22.0	0.74	678.6
0.045	22.5	0.78	692.3
0.049	22.8	0.84	703.0
0.052	22.9	0.89	704.9
0.055	23.6	0.94	726.4
0.057	23.9	0.99	734.0
0.060	24.2	1.04	743.8
0.073	26.0	1.24	797.0
0.085	27.6	1.44	844.3
0.097	29.7	1.65	906.5
0.109	31.3	1.85	953.2
0.121	32.8	2.05	995.9
0.134	35.0	2.26	1061.3
0.146	36.6	2.46	1108.2
0.158	39.0	2.66	1176.8
0.170	40.8	2.87	1230.7
0.182	42.3	3.07	1272.7
0.195	44.4	3.27	1332.8
0.207	46.1	3.48	1381.6
0.219	47.8	3.68	1430.2
0.231	49.8	3.88	1486.8
0.261	54.0	4.38	1601.3
0.291	57.0	4.89	1682.4
0.349	64.3	5.85	1879.2
0.425	70.9	7.11	2044.5
0.500	77.8	8.36	2211.9
0.575	82.5	9.61	2315.4
0.651	87.7	10.88	2425.8
0.726	92.5	12.12	2522.1
0.801	98.0	13.38	2635.8
0.876	101.1	14.64	2679.2
0.952	103.8	15.90	2710.5
1.027	105.3	17.15	2708.6
1.103	105.4	18.41	2670.2
1.201	108.6	20.05	2696.1



G-52675

50072R

MC10-1

41-41.5

Txu

G-52675

S0072R

MC10-1

41-41.5

Txuu

G-52675

S0072R

MC10-1

41-41.5

Txu

G-52675
S0072R
MC10-1
41-41.5
Txuu

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : URS/ARUP/HMM JV
 Project : California High Speed Train
 Job # : 2636-001.0
 Boring # S0072R
 Sample # : U18
 Depth (ft) : 80
 Date tested : 11/28/13
 Soil : Light greenish gray silty clay

Data Reduction:

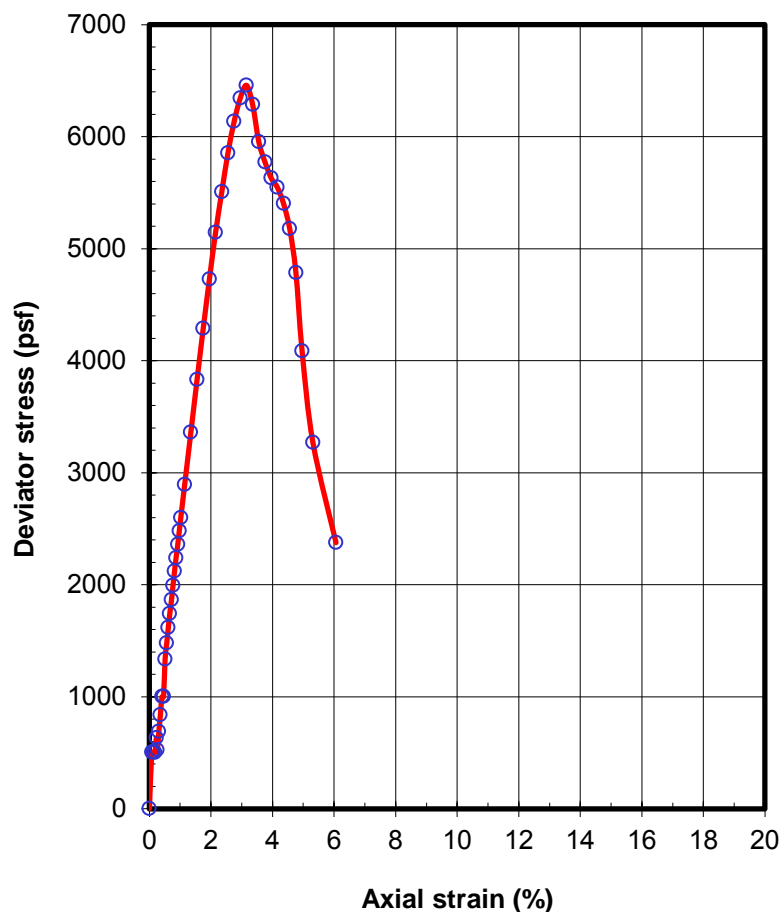
Dial factor = 1.0 in/unit
 Load factor = 1.0 lb/unit

Specimen: Total wt. = 1255.6 gms
 Ht. = 6.050 in
 Ave dia. = 2.847 in
 Area = 6.367 sq.in
 Volume = 631.2 c.c.
 Shearing rate = 0.03 inch/min
 Shearing rate = 0.5 %/min
 Gs (assumed) = 2.70

Test Report:

Void ratio = 0.709
 Ht/Dia ratio = 2.13
 Moisture = 25.9 %
 Total density = 124.1 pcf
 Dry density = 98.6 pcf
 Saturation = 98.7 %
 Chamber pressure = 11520 psf
 Max. deviator stress = 6459 psf
 Strain @ failure = 3.15 %

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	22.3	0.08	503.0
0.006	22.3	0.13	502.8
0.009	22.3	0.18	502.5
0.012	28.1	0.23	633.3
0.014	23.3	0.26	524.5
0.017	30.5	0.31	688.3
0.020	37.1	0.36	835.2
0.023	44.4	0.41	1000.6
0.026	44.4	0.46	1000.1
0.029	59.3	0.51	1334.0
0.032	65.8	0.56	1478.6
0.035	71.9	0.61	1615.8
0.038	77.5	0.66	1742.0
0.042	83.0	0.72	1863.3
0.045	88.8	0.77	1992.7
0.048	94.5	0.82	2119.3
0.051	99.9	0.87	2238.9
0.054	105.2	0.92	2358.2
0.057	110.8	0.97	2481.2
0.060	116.1	1.02	2598.5
0.068	129.4	1.15	2892.7
0.080	150.6	1.35	3361.2
0.092	172.0	1.55	3829.0
0.104	192.9	1.75	4287.1
0.116	213.2	1.95	4728.8
0.128	232.5	2.15	5144.9
0.141	249.4	2.35	5506.9
0.153	265.6	2.55	5853.9
0.165	278.9	2.75	6134.4
0.177	289.1	2.95	6344.7
0.189	294.9	3.15	6458.6
0.201	287.6	3.35	6286.5
0.213	272.9	3.56	5952.9
0.225	265.2	3.76	5773.4
0.238	259.2	3.96	5630.5
0.250	255.9	4.16	5547.2
0.262	249.8	4.36	5402.4
0.274	239.8	4.56	5175.8
0.286	222.1	4.76	4784.4
0.298	190.1	4.96	4086.9
0.320	152.6	5.31	3268.1
0.365	111.9	6.06	2376.5



Gr-52675

S0072R

U18

80-82

TX-UV

Gr-52675

S0072R

U18

80-82

TX-UU

Gr-52675

S0072R

U18

80-82

TX-UU



Gr-52675

S0072R

U18

80-82

TX-UU

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : URS/ARUP/HMM JV
 Project : California High Speed Train
 Job # : 2636-001.0
 Boring # : S0072R
 Sample # : MC20-1
 Depth (ft) : 91.0-91.5
 Date tested : 11/23/13
 Soil : Grayish brown clay with sand

Data Reduction:

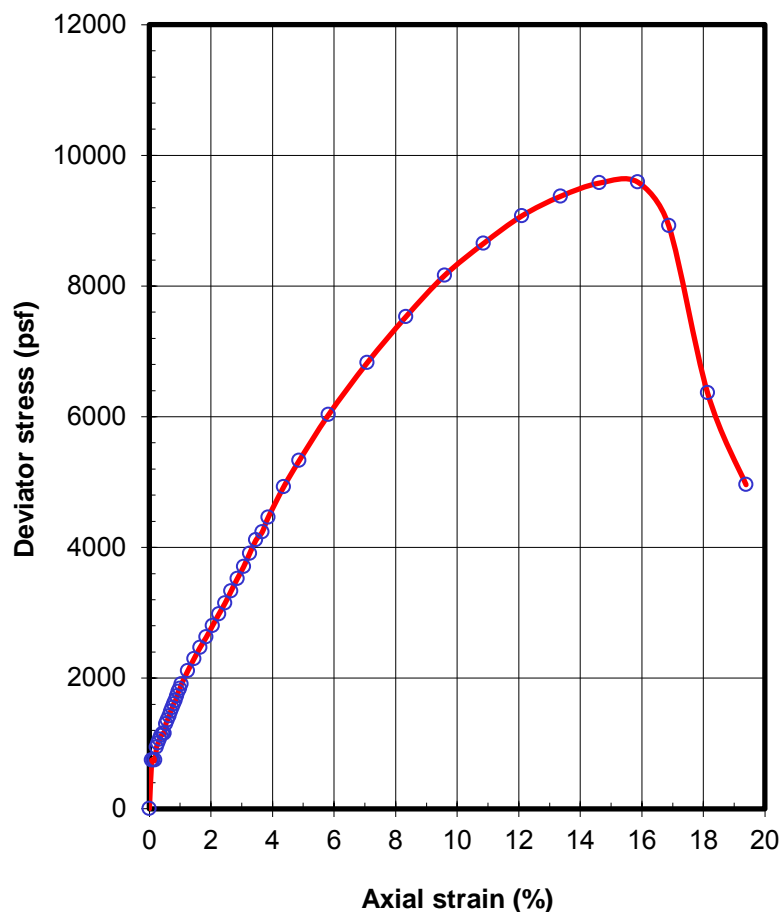
Dial factor = 1.0 in/unit
 Load factor = 1.0 lb/unit


Specimen: Total wt. = 941.2 gms
 Ht. = 5.810 in
 Ave dia. = 2.420 in
 Area = 4.601 sq.in
 Volume = 438.1 c.c.
 Shearing rate = 0.04 inch/min
 Shearing rate = 0.75 %/min
 Gs (assumed) = 2.70

Test Report:

Void ratio = 0.471
 Ht/Dia ratio = 2.40
 Moisture = 17.0 %
 Total density = 134.1 pcf
 Dry density = 114.6 pcf
 Saturation = 97.6 %
 Chamber pressure = 12240 psf
 Max. deviator stress = 9591 psf
 Strain @ failure = 15.87 %

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	23.7	0.08	742.7
0.005	23.7	0.13	742.3
0.009	23.7	0.18	741.9
0.012	30.1	0.23	941.1
0.014	32.1	0.28	1000.9
0.017	33.9	0.33	1058.2
0.020	35.9	0.38	1118.2
0.023	37.0	0.44	1153.2
0.026	37.0	0.49	1152.6
0.029	41.6	0.53	1295.8
0.032	43.5	0.58	1354.9
0.035	45.5	0.64	1415.0
0.038	47.9	0.69	1489.1
0.041	49.7	0.74	1542.4
0.044	51.6	0.79	1603.2
0.047	53.2	0.85	1651.7
0.050	55.6	0.89	1723.5
0.053	57.9	0.94	1793.9
0.056	59.4	0.99	1839.3
0.059	61.5	1.04	1905.3
0.070	68.2	1.25	2107.3
0.082	74.4	1.45	2294.2
0.094	80.1	1.64	2465.7
0.105	85.4	1.85	2624.6
0.117	91.4	2.05	2802.0
0.129	97.3	2.25	2976.2
0.141	103.1	2.46	3146.0
0.152	109.3	2.65	3330.3
0.164	115.8	2.86	3521.0
0.176	122.0	3.06	3701.9
0.187	129.0	3.26	3905.0
0.199	136.1	3.46	4110.4
0.211	140.4	3.66	4233.7
0.222	148.2	3.86	4458.1
0.252	164.6	4.36	4927.3
0.281	178.9	4.86	5325.0
0.336	204.5	5.82	6027.9
0.409	234.8	7.08	6828.0
0.482	262.5	8.33	7530.1
0.555	288.4	9.59	8160.7
0.628	310.0	10.85	8648.4
0.701	329.8	12.10	9073.4
0.774	345.6	13.35	9372.3
0.847	358.4	14.61	9575.9
0.920	364.3	15.87	9590.7
0.979	342.9	16.87	8920.8
1.052	248.5	18.13	6366.6
1.124	196.6	19.38	4960.4





G-52675
S0072R
ML20-1
91-91.5
TXUM

G-52675
S0072R
MC20-1
91-91.5
TXUM

G-52675
S0072R
MC20-1
91-91.5
TXUM

G-52675
S0072R
ML20-1
91-91.5
TXUM

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : URS/ARUP/HMM JV
 Project : California High Speed Train
 Job # : 2636-001.0
 Boring # : S0072R
 Sample # : MC22-2
 Depth (ft) : 100.5-101.0
 Date tested : 11/23/13
 Soil : Olive gray clay with sand

Data Reduction:

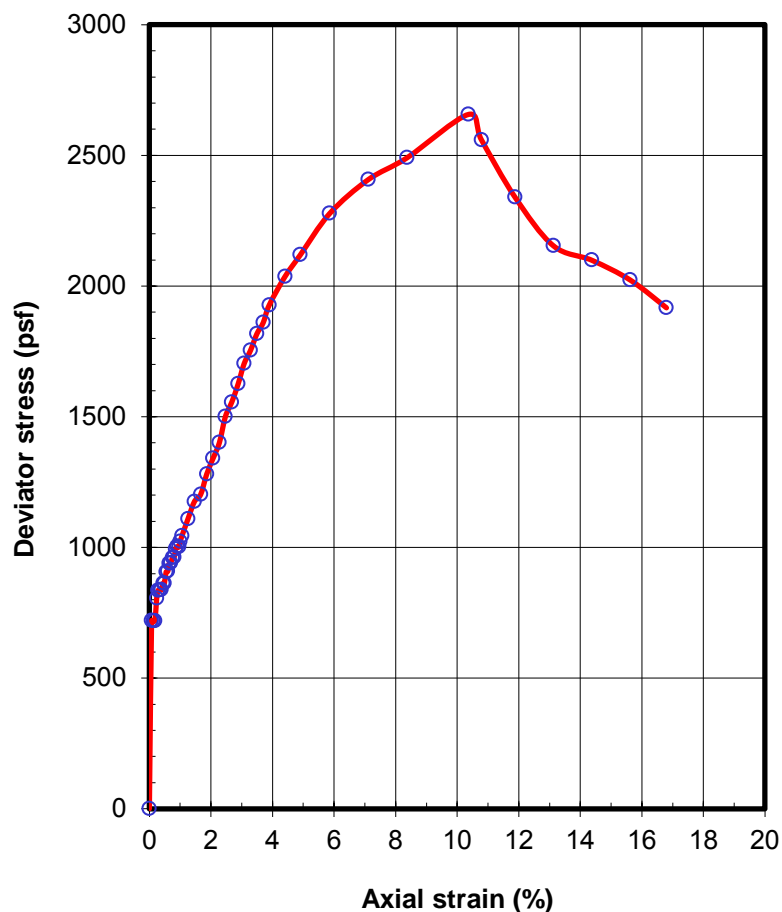
Dial factor = 1.0 in/unit
 Load factor = 1.0 lb/unit

Specimen: Total wt. = 879.9 gms
 Ht. = 6.000 in
 Ave dia. = 2.427 in
 Area = 4.627 sq.in
 Volume = 454.9 c.c.
 Shearing rate = 0.06 inch/min
 Shearing rate = 1 %/min
 Gs (assumed) = 2.70

Test Report:

Void ratio = 0.823
 Ht/Dia ratio = 2.47
 Moisture = 30.6 %
 Total density = 120.7 pcf
 Dry density = 92.4 pcf
 Saturation = 100.4 %
 Chamber pressure = 12960 psf
 Max. deviator stress = 2657 psf
 Strain @ failure = 10.37 %

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.002	23.1	0.07	719.5
0.006	23.1	0.13	719.1
0.009	23.1	0.18	718.7
0.012	25.9	0.24	805.1
0.015	26.9	0.28	834.8
0.018	27.0	0.33	836.9
0.022	27.0	0.39	838.0
0.025	27.8	0.44	862.9
0.027	27.8	0.49	862.5
0.031	29.3	0.54	906.0
0.034	29.4	0.60	908.8
0.037	30.3	0.64	938.3
0.040	30.4	0.70	940.8
0.043	31.1	0.75	961.1
0.047	31.2	0.81	962.5
0.049	32.2	0.85	994.0
0.052	32.5	0.91	1003.2
0.056	32.5	0.96	1001.8
0.058	33.2	1.00	1023.1
0.062	33.9	1.06	1044.2
0.073	36.1	1.25	1109.1
0.086	38.3	1.46	1175.1
0.098	39.3	1.67	1203.0
0.110	41.9	1.86	1280.6
0.122	44.0	2.07	1340.7
0.135	46.1	2.27	1401.1
0.146	49.4	2.47	1500.9
0.159	51.4	2.68	1555.8
0.171	53.8	2.88	1625.7
0.183	56.5	3.08	1703.5
0.195	58.3	3.29	1754.1
0.208	60.5	3.49	1817.2
0.220	62.1	3.70	1860.0
0.232	64.4	3.89	1927.2
0.262	68.4	4.40	2036.1
0.292	71.6	4.90	2119.4
0.350	77.7	5.86	2277.8
0.425	83.3	7.11	2407.1
0.500	87.3	8.37	2490.7
0.620	95.2	10.37	2656.8
0.646	92.2	10.79	2558.7
0.711	85.3	11.88	2340.4
0.785	79.7	13.12	2154.4
0.861	78.8	14.38	2098.8
0.936	77.0	15.62	2022.9
1.006	74.0	16.80	1916.9



G-52675
S0072R
Mc22-2
100.5-101
TX 4U

G-52675
S0072R
Mc22-2
100.5-101
TX 4U

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : URS/ARUP/HMM JV
 Project : California High Speed Train
 Job # : 2636-001.0
 Boring # : S0072R
 Sample # : U23
 Depth (ft) : 105
 Date tested : 11/28/13
 Soil : Greenish gray clay

Data Reduction:

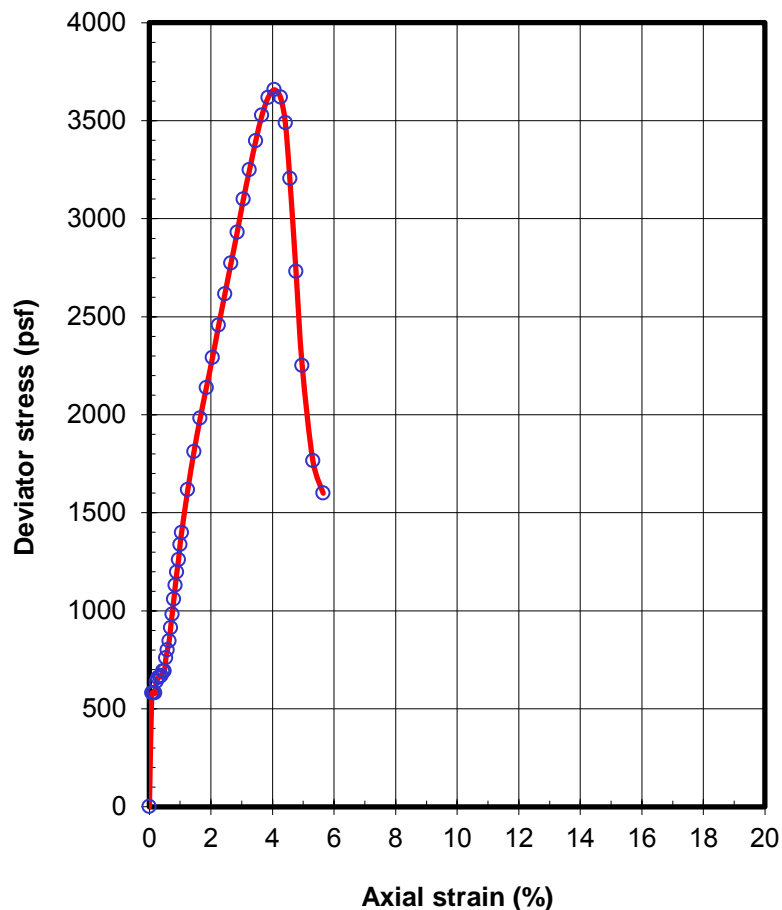
Dial factor = 1.0 in/unit
 Load factor = 1.0 lb/unit

Specimen: Total wt. = 1206.8 gms
 Ht. = 6.070 in
 Ave dia. = 2.853 in
 Area = 6.397 sq.in
 Volume = 636.3 c.c.
 Shearing rate = 0.03 inch/min
 Shearing rate = 0.5 %/min
 Gs (assumed) = 2.70

Test Report:

Void ratio = 0.895
 Ht/Dia ratio = 2.13
 Moisture = 33.1 %
 Total density = 118.3 pcf
 Dry density = 88.9 pcf
 Saturation = 99.9 %
 Chamber pressure = 15840 psf
 Max. deviator stress = 3658 psf
 Strain @ failure = 4.06 %

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	25.8	0.08	580.2
0.006	25.8	0.13	580.0
0.009	25.8	0.18	579.6
0.012	28.4	0.23	638.0
0.015	29.2	0.28	655.9
0.019	29.5	0.33	662.5
0.022	29.8	0.38	667.7
0.025	30.8	0.43	691.1
0.028	30.8	0.49	690.8
0.031	33.9	0.54	759.1
0.034	35.7	0.59	799.5
0.037	37.8	0.64	844.5
0.040	40.8	0.69	912.6
0.043	43.9	0.74	981.1
0.046	47.4	0.79	1058.0
0.049	50.6	0.84	1129.2
0.052	53.6	0.89	1196.0
0.056	56.5	0.95	1260.2
0.059	60.0	1.00	1337.0
0.062	62.8	1.05	1398.4
0.074	72.7	1.25	1616.7
0.086	81.6	1.45	1810.1
0.098	89.5	1.65	1981.0
0.111	96.7	1.85	2136.6
0.123	103.9	2.05	2290.7
0.135	111.6	2.25	2455.6
0.147	119.1	2.45	2614.6
0.159	126.5	2.65	2773.1
0.171	134.0	2.85	2930.5
0.184	142.0	3.05	3099.4
0.196	149.2	3.25	3249.1
0.208	156.3	3.45	3396.6
0.220	162.6	3.66	3526.7
0.232	167.1	3.86	3617.3
0.245	169.4	4.06	3657.9
0.257	167.9	4.26	3619.5
0.266	162.1	4.42	3488.3
0.275	149.1	4.56	3203.6
0.287	127.3	4.76	2729.5
0.300	105.2	4.96	2251.0
0.321	82.8	5.31	1764.5
0.341	75.3	5.65	1599.8



G-52675

S0072R

U23

105110

TX44

G-52675
S0072R
U23
105110
TX44

G-52675

S0072R

U23

105110

TX44

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : URS/ARUP/HMM JV
 Project : California High Speed Train
 Job # : 2636-001.0
 Boring # S0072R
 Sample # : MC24-1
 Depth (ft) : 111
 Date tested : 12/01/13
 Soil : Greenish gray clayey silt

Data Reduction:

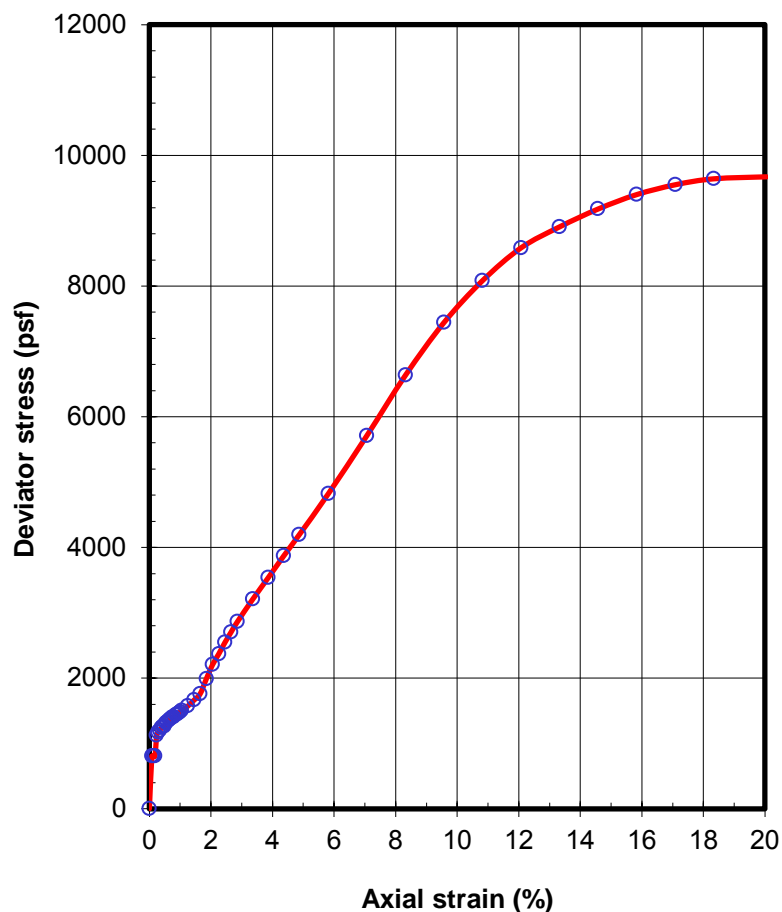
Dial factor = 1.0 in/unit
 Load factor = 1.0 lb/unit

Specimen: Total wt. = 836.6 gms
 Ht. = 5.690 in
 Ave dia. = 2.423 in
 Area = 4.614 sq.in
 Volume = 430.2 c.c.
 Shearing rate = 0.03 inch/min
 Shearing rate = 0.5 %/min
 Gs (assumed) = 2.70

Test Report:

Void ratio = 0.764
 Ht/Dia ratio = 2.35
 Moisture = 27.1 %
 Total density = 121.3 pcf
 Dry density = 95.5 pcf
 Saturation = 95.6 %
 Chamber pressure = 17280 psf
 Max. deviator stress = 9672 psf
 Strain @ failure = 20.05 %

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	25.8	0.08	804.9
0.006	25.8	0.13	804.5
0.009	25.8	0.18	804.1
0.011	36.0	0.23	1121.6
0.014	37.6	0.28	1170.6
0.017	38.5	0.34	1196.6
0.020	39.8	0.39	1237.3
0.023	40.6	0.44	1261.9
0.026	40.6	0.49	1261.2
0.029	42.3	0.54	1311.8
0.032	43.0	0.59	1333.3
0.035	43.8	0.64	1357.8
0.038	44.4	0.69	1377.3
0.040	45.2	0.74	1399.1
0.043	45.3	0.79	1404.0
0.046	46.3	0.85	1432.3
0.049	46.7	0.90	1445.6
0.052	47.4	0.95	1464.5
0.055	47.9	1.00	1481.2
0.058	48.7	1.05	1503.9
0.069	51.0	1.25	1571.7
0.081	54.1	1.45	1662.5
0.092	57.3	1.65	1758.3
0.103	64.9	1.85	1989.3
0.115	72.1	2.05	2204.7
0.126	77.7	2.25	2369.4
0.138	83.6	2.45	2544.9
0.149	89.0	2.65	2703.7
0.161	94.3	2.86	2860.0
0.189	106.4	3.36	3208.8
0.218	117.8	3.86	3535.5
0.246	129.7	4.36	3869.8
0.275	141.1	4.86	4190.6
0.329	164.0	5.81	4821.6
0.400	196.9	7.06	5710.1
0.471	231.8	8.32	6632.9
0.543	263.6	9.57	7439.9
0.614	290.4	10.82	8081.1
0.685	312.8	12.07	8583.6
0.756	329.3	13.33	8906.2
0.827	344.3	14.57	9178.5
0.899	357.8	15.83	9399.5
0.970	369.1	17.08	9550.5
1.041	378.3	18.33	9641.6
1.139	387.6	20.05	9672.2



G-52675

S0072R

MC24-1

III-III.5

TXUV



G-52675

S0072R

MC24-1

III-III.5

TXUW

G-52675

S0072R

MC24-1

III-III.5

TXUV

G-52675

S0072R

MC24-1

III-III.5

TXUV

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : URS/ARUP/HMM JV
 Project : California High Speed Train
 Job # : 2636-001.0
 Boring # : S0072R
 Sample # : MC30-1
 Depth (ft) : 141
 Date tested : 12/01/13
 Soil : Greenish gray silt

Data Reduction:

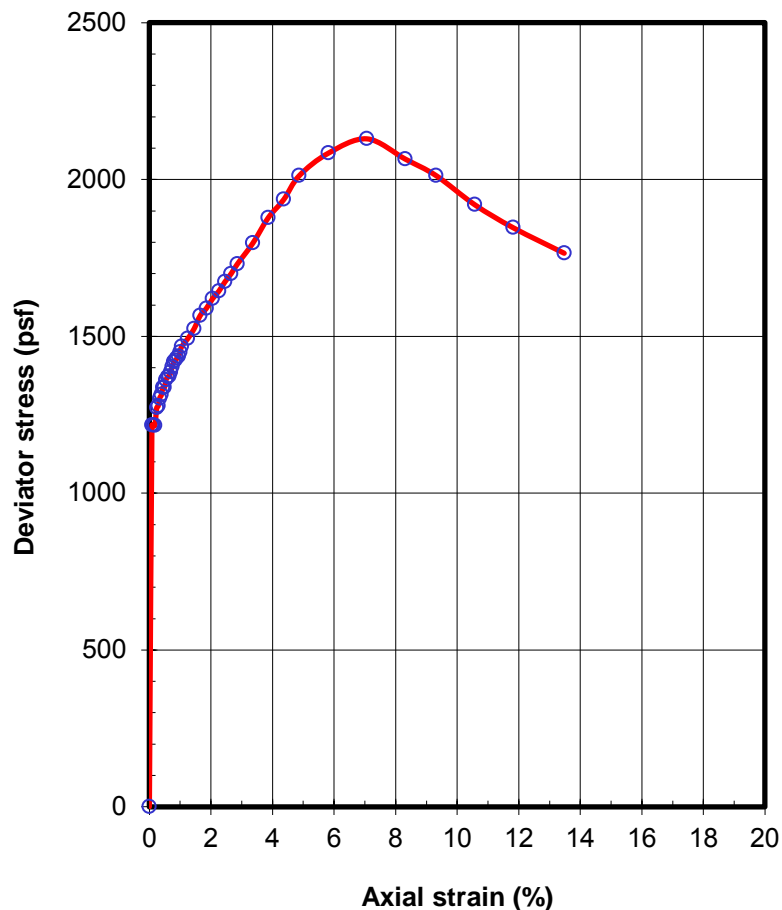
Dial factor = 1.0 in/unit
 Load factor = 1.0 lb/unit

Specimen: Total wt. = 784.4 gms
 Ht. = 5.450 in
 Ave dia. = 2.420 in
 Area = 4.601 sq.in
 Volume = 411.0 c.c.
 Shearing rate = 0.03 inch/min
 Shearing rate = 0.5 %/min
 Gs (assumed) = 2.70

Test Report:

Void ratio = 0.830
 Ht/Dia ratio = 2.25
 Moisture = 29.4 %
 Total density = 119.1 pcf
 Dry density = 92.1 pcf
 Saturation = 95.5 %
 Chamber pressure = 21600 psf
 Max. deviator stress = 2130 psf
 Strain @ failure = 7.06 %

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	38.9	0.08	1217.1
0.005	38.9	0.13	1216.5
0.008	38.9	0.18	1215.9
0.011	40.7	0.24	1271.6
0.014	41.0	0.29	1277.8
0.016	41.8	0.33	1302.5
0.019	42.1	0.39	1313.6
0.022	42.9	0.44	1336.9
0.025	42.9	0.49	1336.3
0.027	43.7	0.54	1360.3
0.030	44.1	0.59	1370.8
0.033	44.1	0.64	1372.6
0.036	44.6	0.69	1385.3
0.038	45.2	0.74	1402.8
0.041	45.7	0.80	1418.3
0.044	45.9	0.85	1423.2
0.047	46.1	0.89	1430.0
0.050	46.4	0.95	1436.9
0.053	46.8	1.00	1449.6
0.055	47.4	1.05	1467.0
0.066	48.3	1.25	1493.1
0.077	49.4	1.45	1523.6
0.088	50.9	1.65	1566.3
0.099	51.7	1.85	1589.2
0.110	52.8	2.05	1619.9
0.121	53.7	2.25	1643.5
0.132	54.8	2.45	1673.8
0.143	55.8	2.66	1699.7
0.154	56.9	2.86	1730.4
0.181	59.4	3.36	1797.0
0.208	62.4	3.86	1877.9
0.236	64.7	4.36	1936.1
0.263	67.6	4.87	2011.8
0.315	70.7	5.81	2084.1
0.383	73.2	7.06	2129.8
0.451	72.0	8.31	2065.1
0.506	70.9	9.32	2012.5
0.574	68.6	10.57	1919.7
0.642	66.9	11.82	1846.3
0.732	65.2	13.48	1765.1



G-52675

S0072R

MC30-1

141-141.5

TXUU

G-52675

S0072R

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G-52675

S0072R

MC30-1

141-141.5

TXUU

CONSOLIDATION TEST DATA

Client Name: URS/ARUP/HMM JV

Project Name: CAHST

Project Number: 2636-001.0

Boring No: S0072R

Sample No: U23

Depth (ft): 105-110

Soil: Greenish gray clay

Sample type: Undisturbed

Inundation at end of 3200 psf

Test started: 11/28/2013

Test finished: 12/4/2013

Equip. #: 1354

Moisture & Density Data

	Test specimen		M&D check as received
	Before	After	
Specimen height (in.)	1.00	0.924	3.18
Wt. of specimen + tare (gm)	186.3	181.2	634.3
Tare wt. (gm)	44.8	44.8	0.0
Diameter (in.)	2.420	2.420	2.850
Wet wt. of soil + dish wt. (gm)	186.3	181.2	225.7
Dry wt. of soil + dish wt. (gm)	150.4	150.4	183.6
Wt. of dish (gm)	44.8	44.8	51.0
Wet Density (pcf)	117.20	122.30	119.11
Dry Density (pcf)	87.48	94.72	90.37
Moisture Content (%)	34.0	29.1	31.8
Gs (assumed)	2.70		
e	0.928	0.780	0.866
S (%)	98.9	100.8	99.2
Vt (c.c.)	75.40	69.64	332.57
Vs (c.c.)	39.12	39.12	178.23
Vv (c.c.)	36.29	30.52	154.34

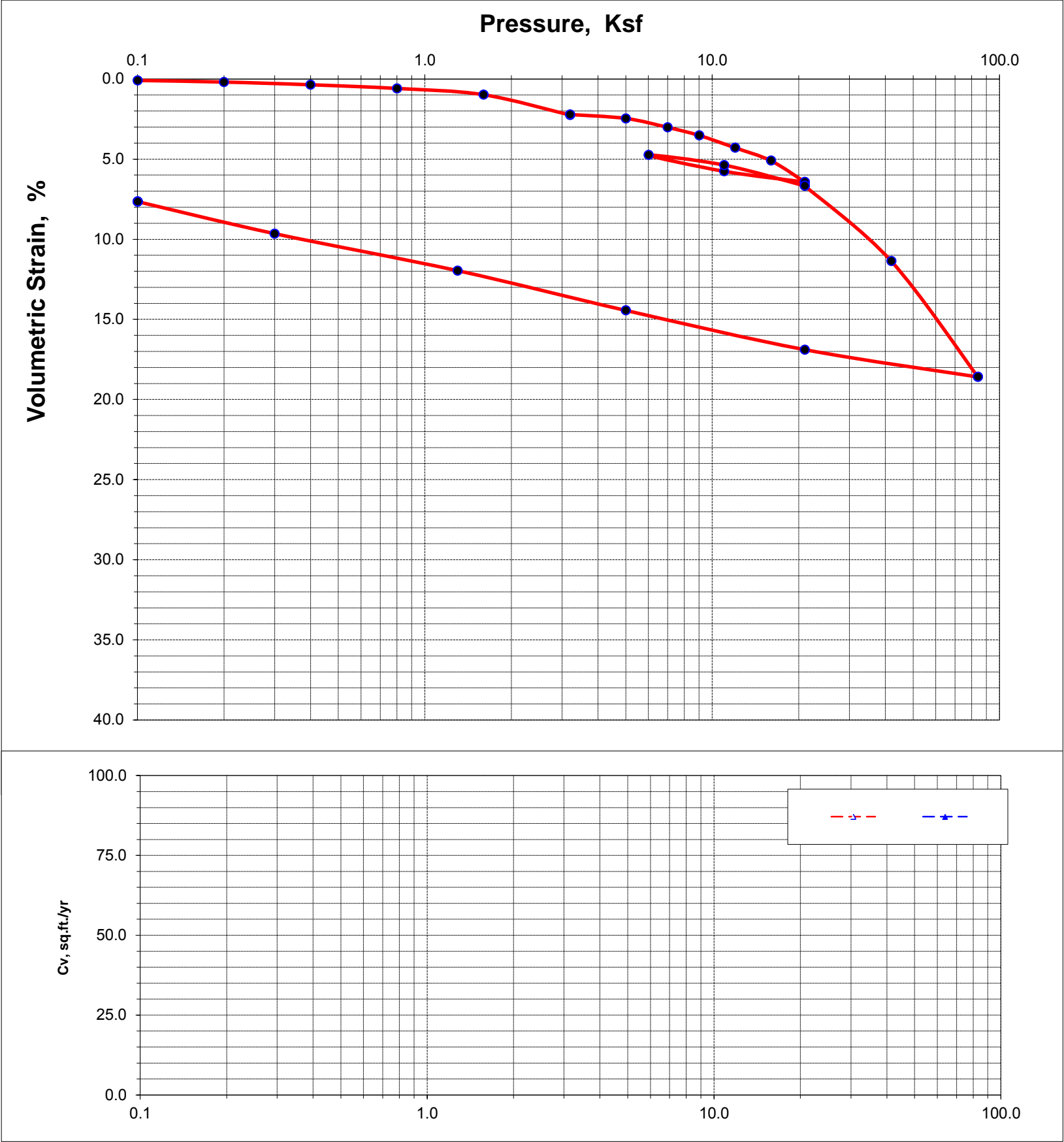
Volumetric Strain & Void Ratio Computation

Load (Ksf)	Dial Rds.	Ev (%)	Void Ratio
0.1	1		
0.1	0.9991	0.09	0.9258
0.2	0.9981	0.19	0.9239
0.4	0.9964	0.36	0.9206
0.8	0.9941	0.59	0.9162
1.6	0.9902	0.98	0.9087
3.2	0.9775	2.25	0.8842
3.2	0.9778	2.22	0.8848
5	0.9754	2.46	0.8802
7	0.9698	3.02	0.8694
9	0.9648	3.52	0.8597
12	0.9571	4.29	0.8449
16	0.949	5.10	0.8293
21	0.937	6.30	0.8061
21	0.937	6.30	0.8061
11	0.9424	5.76	0.8166
6	0.9525	4.75	0.8360
11	0.9463	5.37	0.8241
21	0.9333	6.67	0.7990
21	0.9333	6.67	0.7990
42	0.8894	11.06	0.7144
84	0.8129	18.71	0.5670
84	0.8129	18.71	0.5670
21	0.8311	16.89	0.6020
5	0.8556	14.44	0.6492
1.3	0.8804	11.96	0.6970
0.3	0.9035	9.65	0.7416
0.1	0.9235	7.65	0.7801
0.1	0.9235	7.65	0.7801
0.1	0.9235	7.65	0.7801
0.1	0.9235	7.65	0.7801

Area=	4.601	sq in
POINTS	0.09	0.09
	0.19	0.19
	0.36	0.36
	0.59	0.59
	0.98	0.98
	2.25	2.25
	2.22	2.22
	2.46	2.46
	3.02	3.02
	3.52	3.52
	4.29	4.29
	5.10	5.10
	6.43	6.43
	6.43	6.43
	5.76	5.76
	4.75	4.75
	5.37	5.37
	6.67	6.67
	6.67	6.67
	11.37	11.37
	18.59	18.59
	18.59	18.59
	16.89	16.89
	14.44	14.44
	11.96	11.96
	9.65	9.65
	7.65	7.65
	7.65	7.65
	7.65	7.65
	7.65	7.65

CONSOLIDATION TEST

Boring Number		S0072R	Sample Number		U23	Depth (ft)	105-110		
Soil Description		Greenish gray clay							
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	34.0	117.2	0.928	98.9	1.00	2.420	(assumed) 2.70	60	43
Final	29.1	122.3	0.780	100.8	0.924				



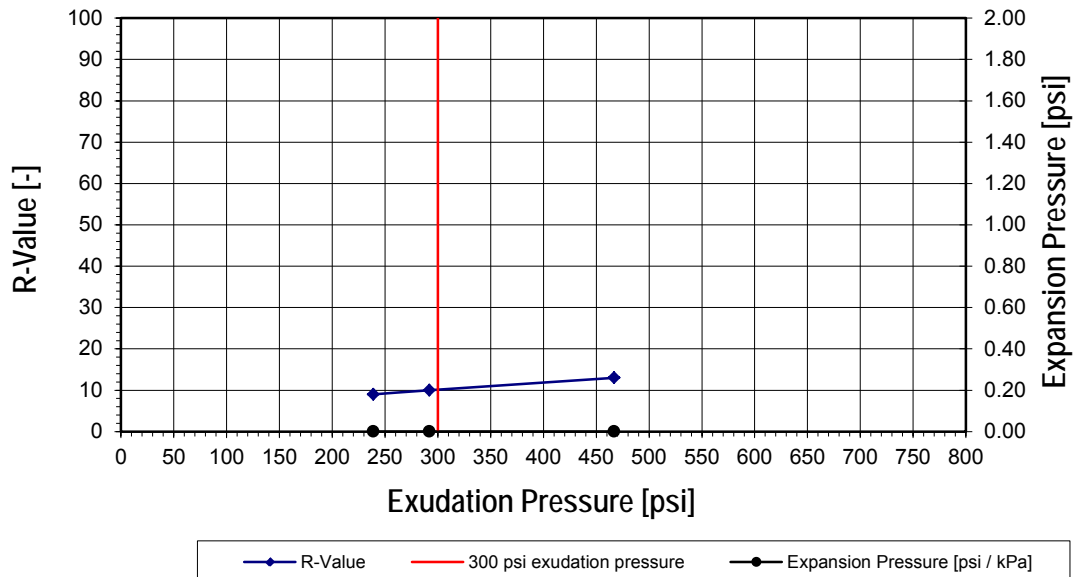
**R-Value ASTM D2844 / CT301**

Project Name: CHSTP-FB
Client Name: URS/ARUP/HMM JV
Type of Material: Brown clayey sand
Sampling Location: S-0072R
Sample No.: B-01. 0.0 to 5.0

ISI File No.: 2636-001.0
ISI Lab No.: G-52675

Test Date: 10/17/13
Run By: LL
Checked By: LL/PH

Specimen #	1		2		3	
Compaction Pressure [psi / kPa]	60	----	70	----	85	----
Total Moisture [%]	14.3		13.7		12.8	
Density[pcf]	117.7		119.3		121.9	
Expansion Pressure [psi / kPa]	0.00	0.00	0.00	0.00	0.00	0.00
Horizontal Pressure at 160 psi [psi / kPa]	136	938	135	931	129	889
Number of Turns D [-]	4.58		4.15		4.18	
Sample Height [in. / mm]	2.65	67.3	2.45	62.2	2.56	65.0
Exudation Pressure [psi / kPa]	239	1648	292	2013	467	3220
R-Value [-]	8.8		10.0		12.6	
Corrected R-Value [-]	9.0		10.0		13.0	



Corrected R-Value at 300 psi / 2.07 MPa Exudation Pressure =

10.0

Direct Shear Moisture and Density Laboratory Results

wet density (pcf) = 125.9

dry density (pcf) = 106.7

moisture (%) = 18.0

Client: URS/ARUP/HMM JV	Boring #: S0072R	Sample #: MC04-1
Project: California High Speed Train	Depth (ft): 11-11.5	
Project #: 2636-001.0	Soil: Greenish gray sand	
TEST REPORT: Direct shear - inundated, consolidated, & drained test		

Direct Shear Moisture and Density Laboratory Results

wet density (pcf) = 122.5

dry density (pcf) = 104.8

moisture (%) = 16.9

Client: URS/ARUP/HMM JV	Boring #: S0072R	Sample #: U16
Project: California High Speed Train	Depth (ft): 70-72	
Project #: 2636-001.0	Soil: Brown silty sand	
TEST REPORT: Direct shear - inundated, consolidated, & drained test		